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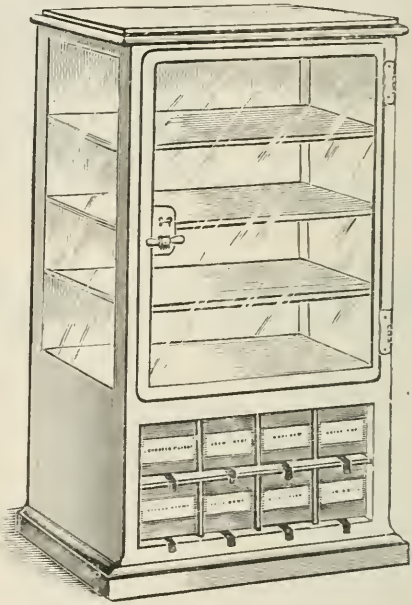

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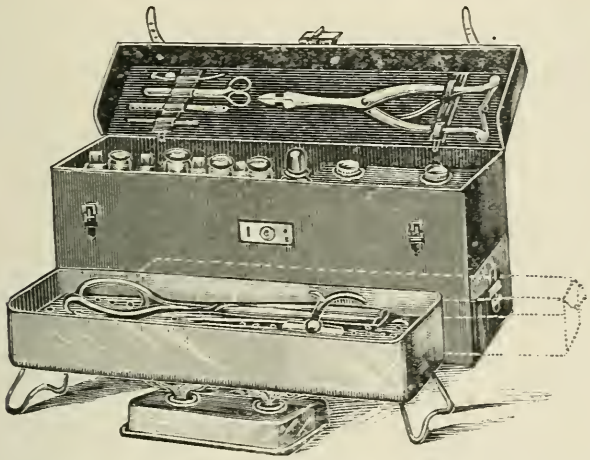

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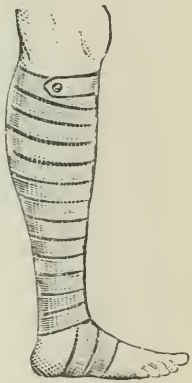

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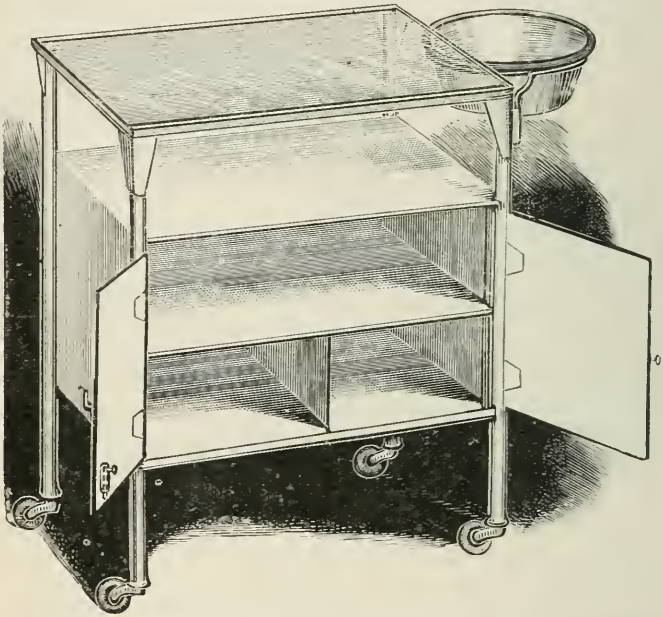

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Fig. 1.

Fig. 1.

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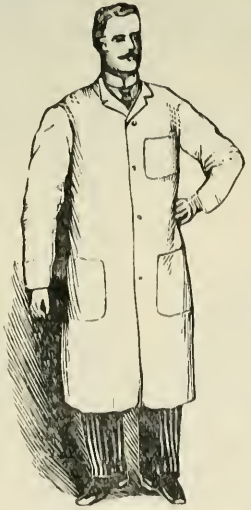

Fig. 2.

Fig. 2.

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Fig. 3.

Fig. 3.

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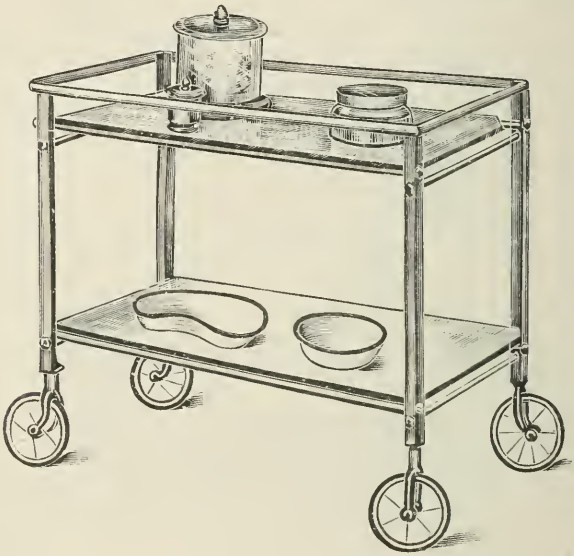

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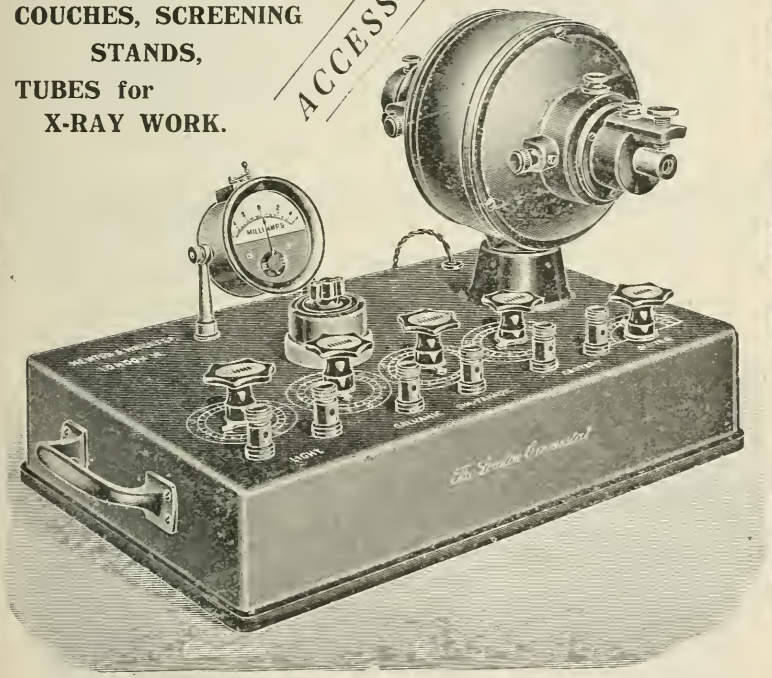

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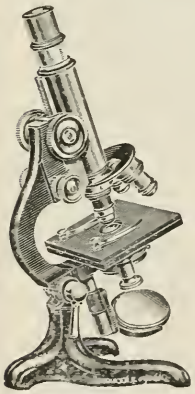

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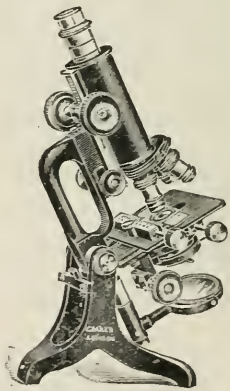

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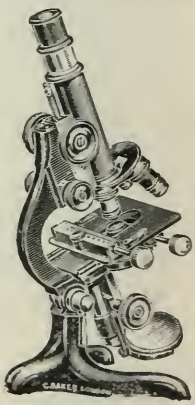

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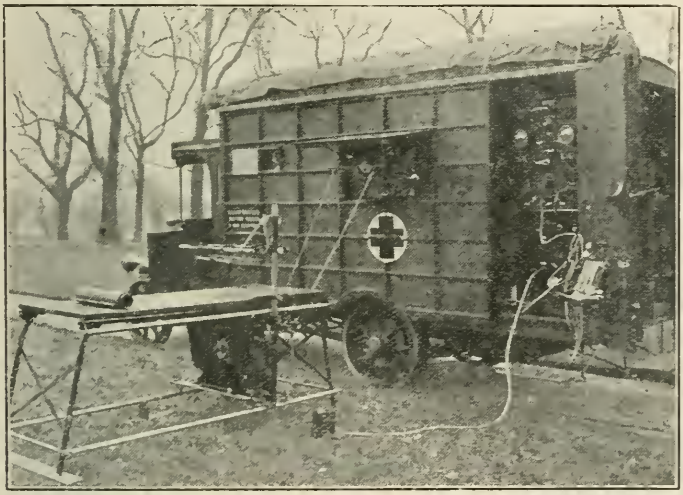

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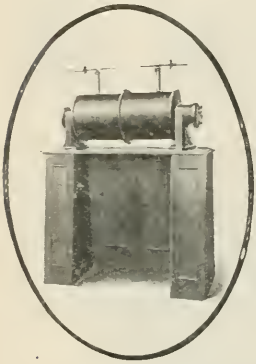

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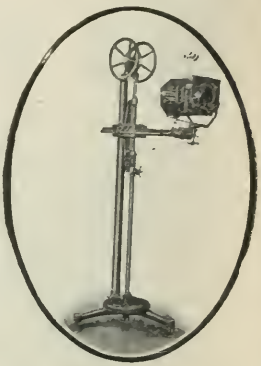

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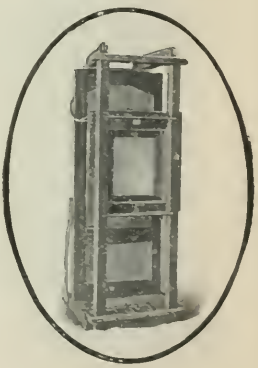

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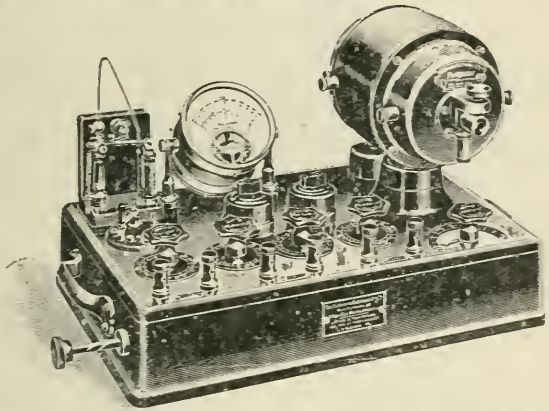

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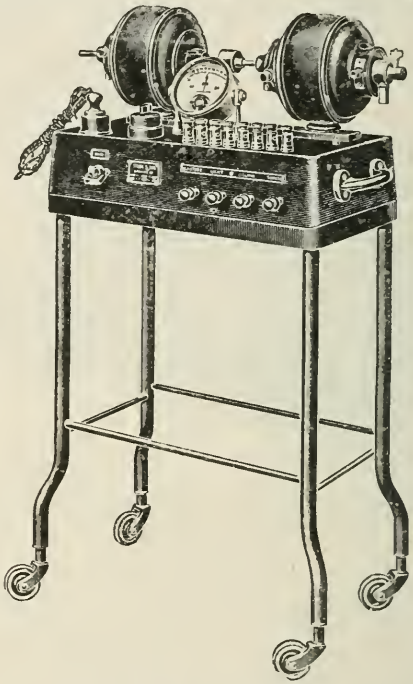

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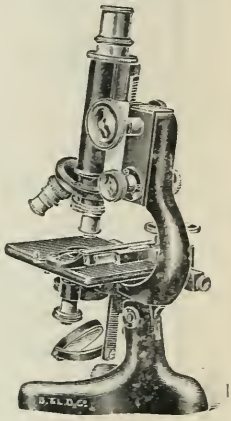

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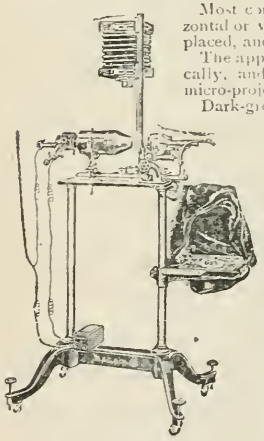

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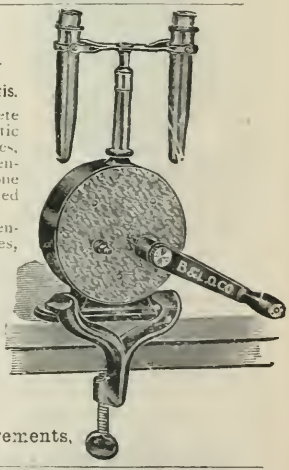

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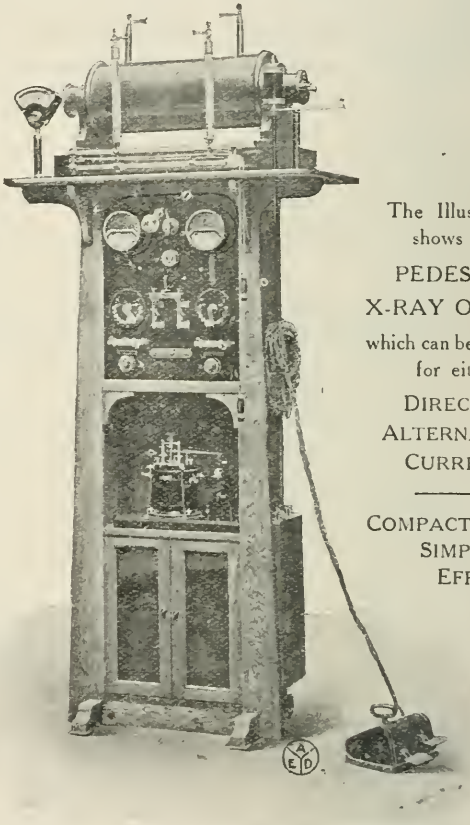

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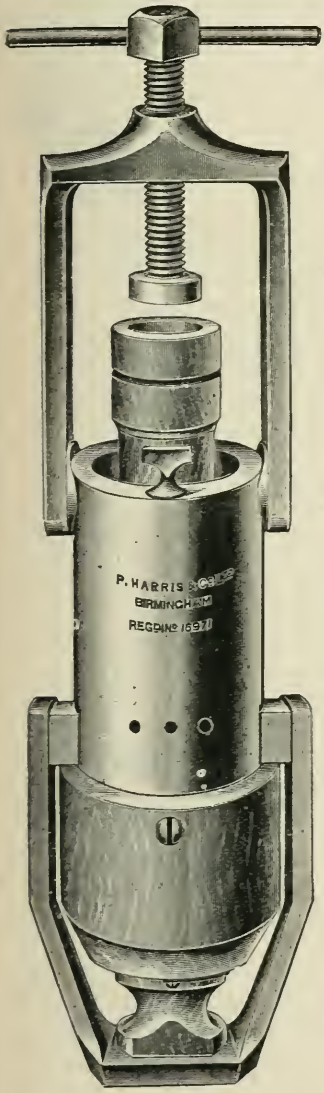

Fig. 7.

The "Hall-Edwards" Carbon Dioxide Snow Collector and Compressor.

Apparatus for Collecting and Applying Carbon Dioxide Snow.

SEE THE LITTLE MANUAL:—

CARBON DIOXIDE SNOW: Its Therapeutic Uses. By J. Hall-Edwards, L.R.C.P., F.R.S. Edin.), Hon. F.R.P.S. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. 1913. *Crown 8vo, pp. 93.* 3s. 6d. *net.*

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ADVANTAGES:—The Collector not only admits of obtaining the small and necessary amount of snow for one treatment without undue waste, but it renders it unnecessary to transfer the snow from one piece of apparatus to another.

The snow is always of the same hardness and the test of complete and proper compression is that the cone should sink in water.

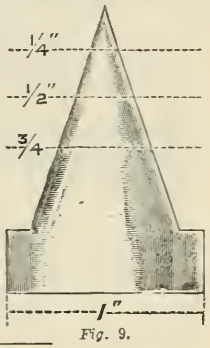

Fig. 9.

Fig. 9.—Diagram of Compressed Snow, showing broad base and cone-shaped projection. The transverse lines indicate the positions for cutting off the cone so as to produce a circle of any desired diameter.

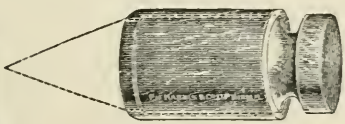

Fig. 10.

Fig. 10.—The applicator showing cone of compressed snow projecting from its lower end.

SET No. I.—

Hall-Edwards' Improved Set for producing CO_2 Hard Snow, comprising:—Collector, fitted with top and bottom stirrup compressor (*see Fig.* 7), Special Rammer and Metal Rods, also used for producing compressed **small pencils** of hard snow, Hardwood Applicator for holding cone of snow (*see Fig.* 10), Special Nipple and Union for attaching to Cylinder. The above apparatus is made of Lignum-Vitæ and Delta Metal, nickel plated .. .. complete **£3 0 0**

SET No. II.—

Same as specification No. I, but including a **4 lb. Cylinder** filled with CO_2, Key and Metal Stand for holding Cylinder.. .. complete **£5 5 0**

SET No. III.—

Same as specification No. I, but including a **7 lb. Cylinder,** filled with CO_2, Key and Metal Stand for holding Cylinder.. .. complete **£5 15 0**

Full Particulars on Application, and sent with each set.

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For VARICOSE VEINS, SPRAINS, & GENERAL SUPPORT.

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Extract from "MEDICAL ANNUAL," 1916:

"We like it better than any of the bandages of this kind which have come under our notice, and think it will prove more comfortable and durable. Its elasticity is not destroyed by washing We have adopted it for general use."

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As used by Dr. MONA ROBERTS.

The Tube is so curved as to comfortably pass over the tongue into the pharynx. It keeps the tongue from falling backwards, and thus is especially helpful in the Trendelenburg position. It is also helpful in edentulous subjects, in whom suction of the lips and cheeks produces occlusion. During the removal of patient from theatre to bed its use prevents any cyanosis or obstruction to respiration due to flexion of the head or the jaw falling back. It establishes a free and unobstructed airway, whatever the position of the head or of the patient.

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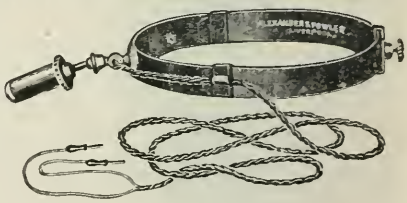

Portable Electric Forehead Lamp, with Four-volt Metallic Filament Bulb. The flexible Head Band is adjustable, so that it can be carried in hand-bag or coat pocket, and is easily and quickly adapted to the head when in use. The bull's-eye lens has a focussing draw-tube, and is mounted on ball-and-socket joint, so that the direction of the rays of light can be altered at will. For **Diagnostic and Operative Work** it will be found of great assistance, as it can be carried to the patient's house and used with small dry battery or accumulator as source of electric supply.

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It contains no free Iodine, Alcohol, or Alkalies. It is an active therapeutic agent, non-depressing, non-irritating, and palatable, presenting Iodine in the most available form for internal administration.

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Contains 5 per cent Iodine, loosely combined in a readily assimilable base. It does not stain. It is a powerful Sorbefacient, Discutient, Antiseptic, and Counter-irritant. It has been used with great success in conjunction with Idogen, in cases of Rheumatoid Arthritis, Goitre, and Enlarged Glands.

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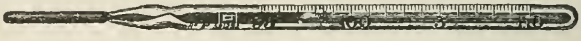

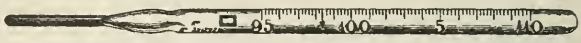

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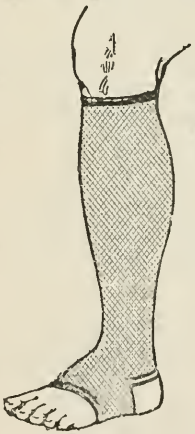

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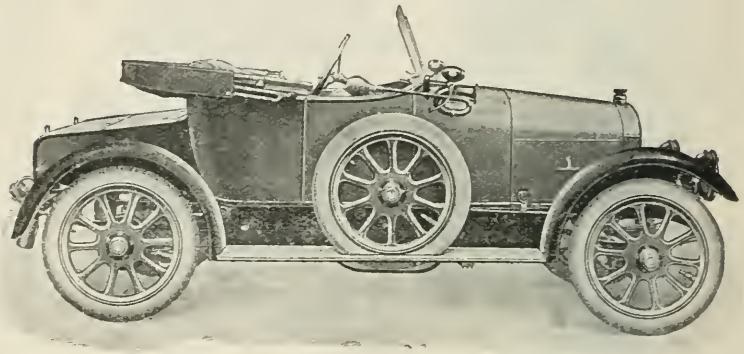

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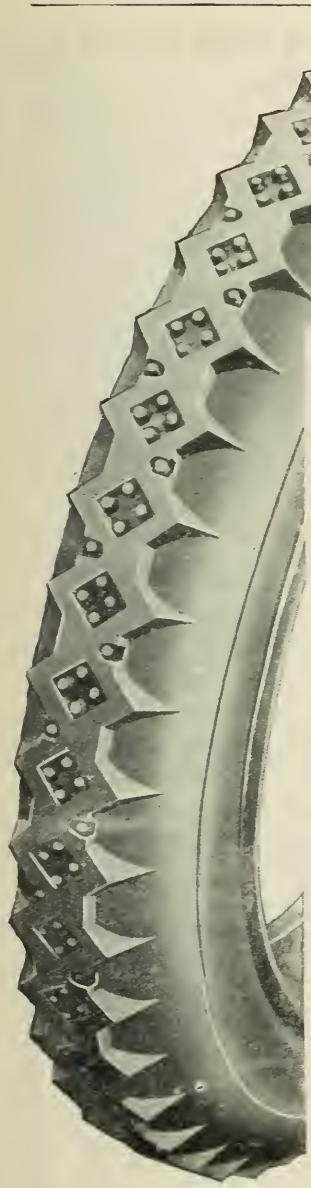

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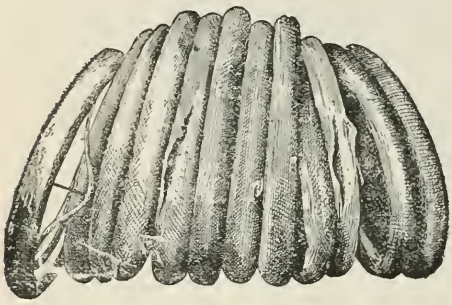

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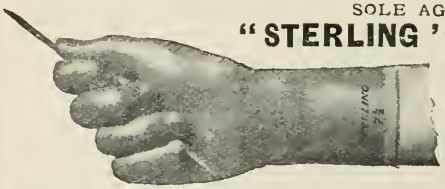

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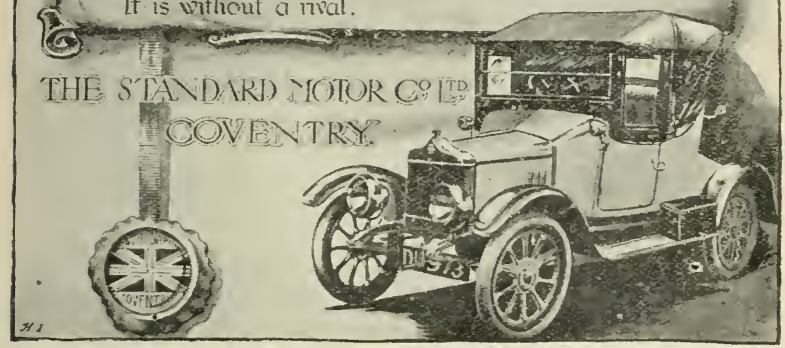

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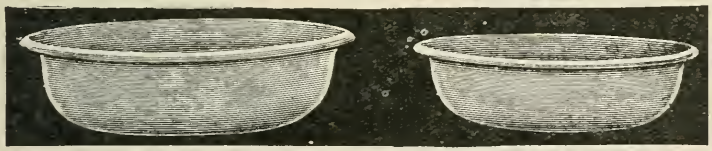

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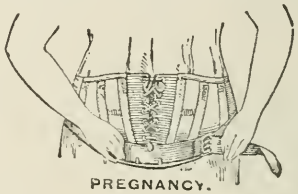

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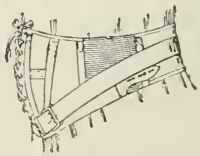

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Pelmanism as an Intellectual and Social Factor.

IT is occasionally urged that in the pages of "Mind and Memory," the business element is predominant, and that other aspects of Mind Training receive less consideration than they are entitled to.

The reason for this is fairly obvious. Business or professional progress is, in this work-a-day world, a subject which the average man or woman has very much at heart. Consequently, the financial value of Pelmanism is the point of primary attraction for probably 60 per cent of those who enrol; but this circumstance does not in any degree dispossess Pelmanism of its supreme importance as an educational and intellectual factor. A fairly lengthy volume would be required to do justice to this theme—the *higher* values of Pelmanism.

Far-seeing readers will be quick to appreciate this, and will recognize that a system which has proved of such signal value to the business and the professional brain-worker must perforce be of at least equal value to those whose occupation is mainly intellectual or social. If assurance were needed upon this point, it is abundantly supplied by the number of complimentary letters received from those who enrolled for the Course from other than pecuniary motives: the amateur and leisured classes being well represented on the Registers of the Institute.

THE HIGHER VALUES.

In many cases, those whose motive originally was material advancement of some kind have been quick to discover the deeper meanings and higher values of Pelmanism—a value far above money. It would be proper to say that there are many thousands of both sexes to whom the Pelman System has been the means of intensifying their interest and pleasure in existence as probably no other agency could have done.

The charms of literature, and in particular the beauties of poetry and descriptive writing, are appreciated by those who adopt Pelmanism as they never appreciated them before. Every phase of existence is sensibly expanded. Life receives a new and deeper meaning with the unfolding of the latent powers of the mind.

"I must have gone about the world with closed eyes before," was the remark of a well-travelled man after he had completed only half the Course. His ejaculation is significant. He is typical of many who, unwittingly, are living with "closed eyes." Indeed, if the Pelman System stopped short at its third book, instead of continuing to a twelfth, it would still be a remarkable and valuable system.

In developing latent (and often unsuspected) **powers of the mind, Pelmanism has not infrequently been the means of changing the whole current of a life,** Many letters might be quoted in evidence of this:

but one will probably suffice. It was received from a British Officer in France : we give it in its entirety :—

> I should like to call your attention to the facts of the story of my Pelman Course.
>
> When I began I was looked upon with disfavour by the C.O. of my Battalion at home as being a sleepy, forgetful, and unsoldierlike sub. When I began your Course my star began to rise—I had the ability, but had not been able to use it. I left the home battalion with my C.O.'s recommendation as being the best officer he had had for more than a year, and came to France.
>
> I was then appointed as a second lieutenant to command a company over the heads of four men with two "pips," and have now three stars and an M.C.
>
> That I was able to make use of my abilities so successfully I attribute entirely to the Pelman System. ———— Captain.

Such a letter calls for no comment : but an extract from another letter (also from a Captain) may appropriately be added :—

> One great point in favour of your system which, if I may say so, you do not make enough of in your advertisements, is the cumulative benefit accruing.
>
> As far as I can see, once having got on the right track and rigidly following the System, there should be no limit to the ultimate mental capacity attained.

AIM AND PURPOSE IN LIFE.

Again, there are numbers who avow their indebtedness to the Pelman Course in another direction—it has led them to examine themselves anew, to recognize their points of weakness or strength, and to introduce aim and purpose into their lives. Indeed, it is surprising how many men and women, including some of high intellectual capacity and achievement, are "drifting" through life with no definite object. This reveals a defect in our educational system, and goes far to justify the enthusiasm of those—and they are many—who urge that the Pelman System should be an integral part of our national education. Self-recognition must precede self-realization, and no greater tribute to Pelmanism could be desired than the frequency of the remark, "I know myself now : I have never really done so before."

Self-expression brings us to another facet of Pelmanism, and a very interesting one. Even a University education may fail to equip a man or woman to maintain himself or herself creditably in the social sense. How often the clever scholar is a social failure—a nonentity even in the circle of his intimates ! His academic "honours" have done nothing to endow him with personal charm or conversational power. His consciousness of a rich store of knowledge does not compensate him for the discovery that he is deficient in the important art of self-expression.

Tact, discerning judgment, adaptability, conversational ability are not "gifts" : they are qualities which can be developed by training. This is emphatically proven by the large number of letters received from Pelman students who have received almost unhoped-for assistance in this direction.

As a system, **Pelmanism is distinguished by its inexhaustible adaptability.** It is this which makes it of value to the University

graduate equally with the salesman, to the woman of leisure and to the busy financier, to the Army officer and to the commercial clerk. **The Pelmanist is in no danger of becoming stereotyped in thought, speech or action:** on the contrary, individuality becomes more pronounced. Greater diversity of "character" would be apparent amongst fifty Pelmanists than amongst any fifty people who had not studied the Course.

The system is, in fact, not a mental strait-jacket but an instrument: instead of attempting to impose universal ideals upon its students, it shows them how to give practical effect to their own ideals and aims. **It completes man or woman in the mental sense, just as bodily training completes them in the physical sense.**

LOST MENTAL ACTIVITIES REGAINED.

There are many who adopt it as a means of regaining lost mental activities. *Elderly men and women* whose lives have been so fully occupied with business, social, or household matters that the intellectual side has been partly or wholly submerged: *successful men* in the commercial world whose enterprises have left them too little leisure to devote to self-culture: *Army officers* who find that the routine of a military life invites intellectual stagnation—these find that the Pelman Course offers them a stairway up to the higher things of life.

Here are two letters which emphasize this. The first is from an Army student, who says:

> The Course has prevented me becoming slack and stagnating during my Army life—this is a most virulent danger, I may add. It inculcates a clear, thorough, courageous method of playing the game of Life—admirably suited to the English temperament, and should prove *moral* salvation to many a business man. "Success," too, would follow—but I consider this as secondary.

The other letter is from a lady of independent means, who felt that at the age of fifty her mind was becoming less active:

> Though leading a busy life, my income is inherited, not earned. My object in studying Pelman methods was not, therefore, in any way a professional one, but simply to improve my memory and mental capacity, which at the age of fifty were, I felt, becoming dull and rusty. I have found the Course not only most interesting in itself, but calculated to give a mental stimulus and keenness and alertness to one's mind, which is just what most people feel the need of at my age.

In short, **it is not merely the fleeting interest of a day that is served by the adoption of Pelmanism, but the interest of a lifetime.** One may utilize the Course as a means of achieving some immediate purpose—financial, social, educational, or intellectual—but the advantages of the training will not end there. **The investment of time will bear rich fruit throughout life,** and in addition to serving a present purpose, will enable many a yet-unformed ideal to be brought within the gates of Realization.

A full description of the Pelman Course, with a complete synopsis of the lessons, is given in "Mind and Memory," a free copy of which (together with "TRUTH'S" special supplement on "Pelmanism") will be sent post free to all readers of "The Medical Annual" who send a postcard to The Pelman Institute, 243, Wenham House, Bloomsbury Street, London, W.C. 1.

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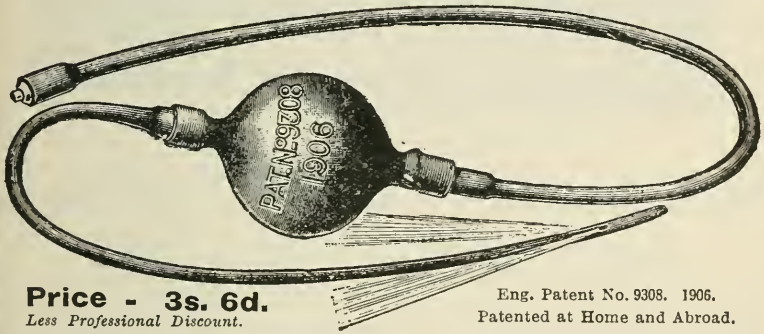

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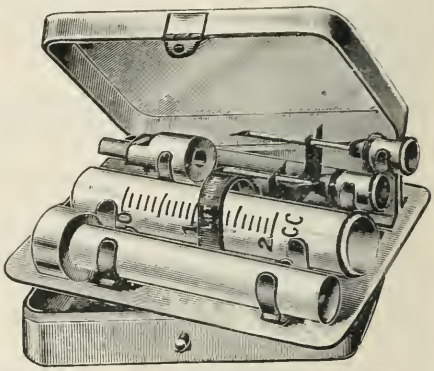

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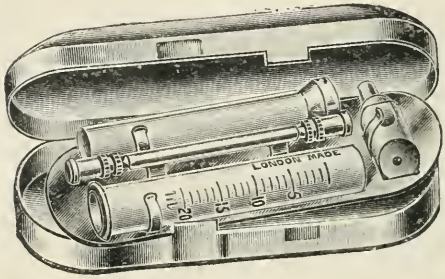

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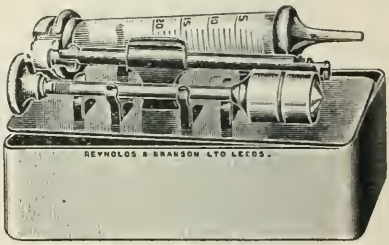

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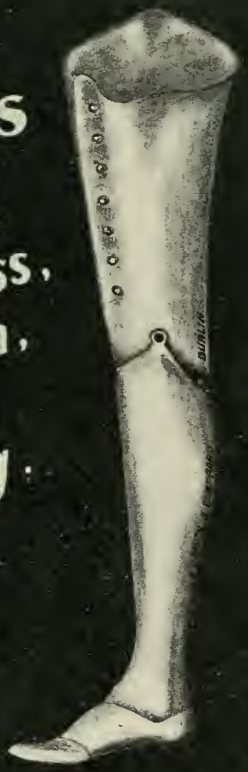

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FRANCIS J. CHARTERIS, M.D., B.Ch.
JOHN D. COMRIE, M.A., M.D., F.R.C.P.
CAREY F. COOMBS, M.D., F.R.C.P.
WM. HENRY DOLAMORE, M.R.C.S., L.R.C.P., L.D.S.R.C.S.
WILLIAM E. FOTHERGILL, M.A., M.D.
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FRANCIS J. CHARTERIS, M.D., B.Ch., Lecturer on Materia Medica and Therapeutics, University of Glasgow; Assistant Physician, Western Infirmary, Glasgow. (*Materia Medica and Therapeutics.*)

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JOHN S. FRASER, M.B., Ch.B., F.R.C.S., Assistant Surgeon, Ear, Throat, and Nose Department, Royal Infirmary, Edinburgh; Aural Surgeon, Edinburgh War Hospital; Lecturer on Diseases of Ear, Throat, and Nose, School of Medicine of Royal Colleges, Edinburgh.
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(*Radio-activity and Electrotherapeutics.*)

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J. RAMSAY HUNT, M.D., New York, Consulting Neurologist, New York Neurological Institute; Neurologist, New York Hospital, Hudson Street Hospital, New York Eye and Ear Infirmary, etc.
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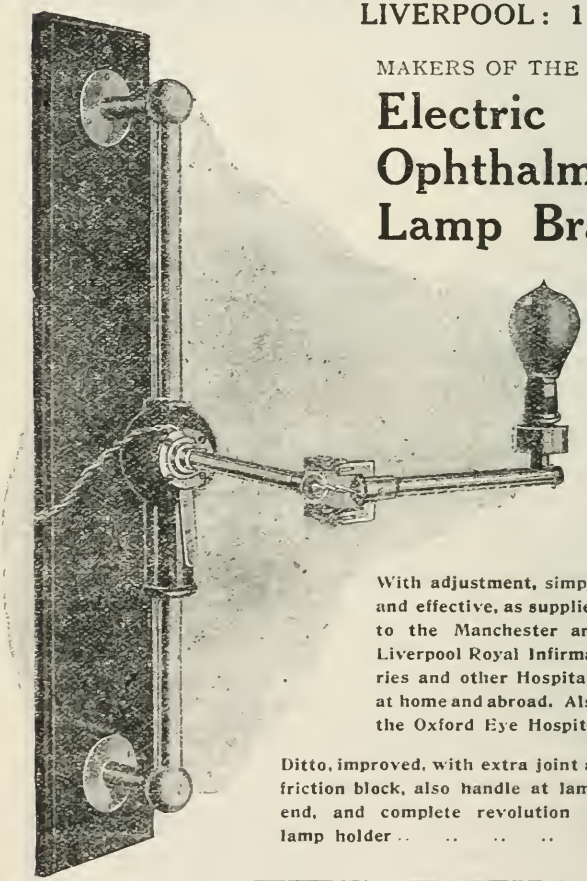

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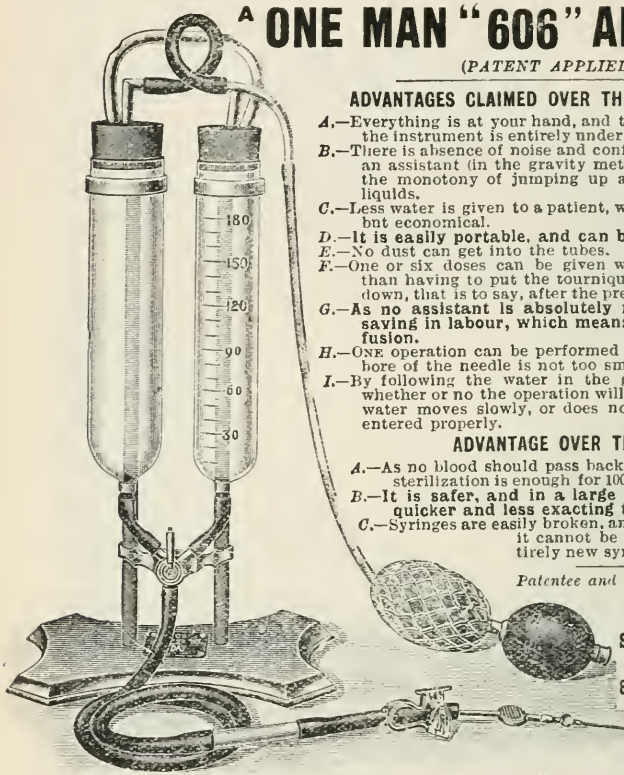

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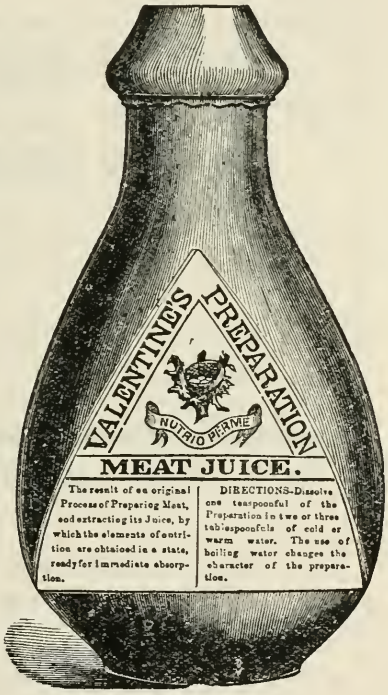
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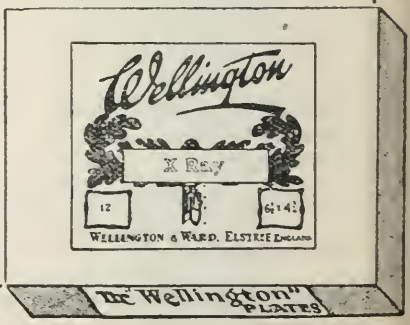


PRICE LIST ON APPLICATION.

Introduction.

A REVIEW OF THE YEAR'S WORK.

BY THE EDITOR.

The Great War in its Relation to Medicine and Surgery.

The Great War has proved a supreme test of the skill and devotion of the medical profession. Its work is to protect from disease and repair injury. How much this has meant is almost beyond conception. We have to multiply the ordinary units of a fighting force by hundreds, and to imagine huge bodies of men packed into narrow trenches in a soil reeking with moisture and laden with septic matter: we must try to realize the enormous force of modern explosives and their shattering effect upon the bodies and nerves of men wholly unaccustomed to war conditions: the silent and deadly poisonous gas, an abomination new to warfare; the strain of a long-continued state of war with all its harassing conditions. Then, when we find that the percentages of deaths from sickness and epidemic disease have been less than in any previous war, that wounds ordinarily mortal have been treated to recovery, and that shattered wrecks of humanity have been restored to useful life, we can think with some pride of the part which our profession has played.

In the Napoleonic Wars the deaths from disease were 97 per cent to 3 per cent killed in battle: even so late as the Boer War the deaths from disease were 67 per cent, while in the present war, which has not had the advantage of being a war of 'movement,' the losses from disease have been under 4 per cent.

We think some of this success is due to the greater receptivity to new ideas which animates the profession of to-day, and the readiness with which old ideals have been abandoned in the hope of making future records eclipse the past.

In the abundance of work, observation, and investigation, there has been a difficulty in keeping the medical officer in touch with the advances made. In France, which has no equivalent

to The Medical Annual, the Government have thought it necessary to publish a series of handbooks for the guidance of their medical staff. Such works must be valuable, as are all monographs which give the result of individual effort in any branch of practice; but long experience has taught us the great difficulty under which an author labours when called upon to present the development of any branch of medicine which is being studied simultaneously in many centres of thought. It requires an organization to collate the work which has been done in all parts of the world, so that the writer has before him the fullest information upon the subject. Under such circumstances it does not matter in which part of the world the author happens to be: whether the article is written in the study or on the battle-field, it becomes a reflex of all existing knowledge up to date. There is also an advantage in bringing the progress of all departments of medicine into a single volume. Their interdependence can only be realized by those who have tried to arrange the matter to the best advantage for ready reference.

It would at first appear very easy to give in a single article all the problems which confront the medical officer who has to treat a simple *gunshot wound*. It is only when we have all the matter before us that we can realize how many departments in medicine have been called upon to answer the questions relative to the immediate and after results of such an injury.

In many cases the localization of the bullet is of primary importance. Very valuable work in the invention of methods for more exact localization has been done both in Great Britain and America, and Mr. Thurstan Holland (Radio-activity and Electrotherapeutics) gives a very complete account of the methods which have found most favour.

The General Treatment of Wounds.

The general treatment of the wound is discussed by Deputy Surgeon-General Wildey (Wounds). He describes the conditions under which *primary* suture may be performed. The most important is that the wound is rendered 'aseptic by the knife,' i.e., all fragments and injured tissues must be removed. The operation must be done a few hours after injury, and the part immobilized.

The prevention of sepsis has formed the subject of much investigation, and there has been considerable conflict of

thought. The results are reviewed with great impartiality by the author.

When secondary suture is delayed on account of sepsis, the '*B.I.P.P.*' and '*Carrel*' methods are the chief claimants for popularity. These are fully described.

Heliotherapy and *Light treatment* have their advocates. The omission of dressings in the treatment appears to be an important factor. *Soap* in solution has been used with satisfactory results, and a reference to the article *Alcohol* (Dictionary of Materia Medica and Therapeutics) shows that *solidified alcohol*, which is a combination of alcohol and Marseilles soap (formula given), has been advocated as very valuable. In the article Syphilis it is mentioned that the specific organism will not live in a solution of soap even when well diluted. Various other antiseptics are discussed in the article Wounds.

One of the worst complications of the wound is *gas gangrene* (Gangrene). The muscle origin of this disease is now fully recognized. In a special article its bacteriology is discussed, and we give a plate, prepared by Dr. Weinberg, illustrating the micro-organisms.

Under the influence of antitoxic serum, Tetanus, one of the most dreaded of wound complications, has been reduced from a ratio of 16 per 1000 wounded to 2 per 1000—a result which represents an enormous saving of life.

Treatment of Wounds in Naval Action also forms the subject of an interesting article by Deputy Surgeon-General Wildey.

Apart from the treatment of the wound itself, we have the damage done to the various structures met with in its track. The repair of such injuries has formed the subject of considerable investigation. Injuries of the bones of the limbs are reported on by Mr. W. I. de Courcy Wheeler (Fractures). It will be seen that the experiences of the war have led to many modifications and improvements in the treatment of these injuries, with the hope of securing the best after-results. In fractures of the thigh-bone, shortening of the limb is sometimes unavoidable. It has been proposed to shorten the sound limb to correspond, and an operation has been devised for this purpose. We do not think it will find much favour.

The treatment of fractures always involves a period of rest during which muscles must waste and tendons sometimes contract. It was formerly a reproach to surgery that the after-treatment of such cases was neglected, but we are now provided

with special hospitals for dealing with these conditions under the care of Colonel Sir Robert Jones. The methods adopted are described and illustrated (Orthopædics). It will be observed that the mistaken view that massage and electricity are *alone* sufficient to restore function to a wasted muscle is not held: it is only by *resisted exercises* that the whole mechanism of locomotion can be brought into play. The effort of the patient is a source of energy greater than can be supplied by any battery.

Injuries to the face and jaw form the subject of another article (Jaws and Face, Injuries of) by Mr. W. H. Dolamore. In it he describes the elaborate methods by which the most ghastly disfigurements are removed by the surgeon's art. The results in such cases are one of the greatest triumphs of modern surgery, and none have made more impression on the public mind.

Abdomen, Gunshot Wounds of. These are reported upon by Dr. E. Wyllys Andrews, and the evidence points to the necessity of early operation to save life. The question whether the bullet has penetrated a hollow viscus is important: when it has not done so, no operation may be necessary.

Wounds in the thorax (Chest, Wounds of) are considered by Dr. Arthur Latham, and the measures to be taken fully described.

Much trouble may arise in the after-treatment of *injuries resulting from laceration of the superficial nerves*, and the remarkable progress made in the suture of nerves, and the conditions under which the operation may be performed, are described (Nerves, Wounds of) by Dr. Ramsay Hunt. The repair of these injuries is another triumph of modern surgery.

Wounds of the *brain and spinal cord* are reported upon very fully by the same writer (Skull, Wounds of, and Spine, Surgery of). In connection with injuries to the spine, the bladder symptoms are of exceptional importance, and this subject is fully dealt with by Mr. Thomson Walker (Bladder). In this article a new method of treating chronic cystitis by *iodine fumes* is of interest.

Eye Injuries are dealt with by Dr. Hugh Thompson, and the 'giant magnet' used for the extraction of foreign bodies is described and illustrated.

The immense concussions of modern shell-fire have caused a very large number of cases of *injuries to the ear*, and frequently a troublesome neurosis is set up. Dr. John S. Fraser gives very

detailed reports on this important subject (Ear, Diseases of), and the article Vertigo, with the elaborate tests now adopted, should also be consulted.

In this connection we have also the general conditions of Shell Shock, reported on by Dr. Ramsay Hunt, who describes the symptoms and treatment of this troublesome complaint. In the same article he also deals with the important subject of neurasthenia in soldiers.

Closely allied to these neuroses we have the difficult problem of *soldier's heart* (Heart, Soldier's), which is reported upon by Dr. Carey F. Coombs. He agrees with the view that "the condition called soldier's heart is not an entity, but includes merely the worst examples of a circulatory instability that grades up from the nearly normal to a degree that may completely incapacitate the patient." The wide experience of the war in forming an opinion upon the cardiac capacity of the recruit or the soldier has much modified the value attached to valvular murmurs. "Auscultation is not alone sufficient to establish a diagnosis of valvular disease of the heart, and, if too much relied on, will, sooner or later, lead to grave errors." This reminds us of an old general who informed us that he had 'valvular disease of the heart.' After examination we informed him that there was nothing to prevent his living to the age of 90. We then discovered that he was already 92.

From Dr. Blomfield's article (Anæsthetics) we gather that, for the lightly-wounded soldier, gas and oxygen is preferred; for the more serious cases, gas, oxygen, and ether. Spinal analgesia is contra-indicated in those who have been recently wounded or lost considerable blood. Rectal anæsthesia has been much used, a mixture of 50 to 75 per cent of ether with olive oil being injected. The importance of washing out the rectum after the operation is insisted upon.

From the article Amputations it will be seen that the mechanical requirements of the artificial limb which will be subsequently fitted is a dominating factor in modern methods. Mr. de Courcy Wheeler very properly treats on both together in his report on the most recent methods.

In cases where the condition of the patient necessitates the *transfusion of blood*, the article *Blood* (Dictionary of Materia Medica and Therapeutics) should be consulted, also '*Acacia*' (*ibid.*). Dr. Charteris reports the experience of the American hospitals, where this operation has been so highly developed that the 'donor' of blood has become a professional occupation.

He also reports on the use of '*Cholin Chloride*' in the treatment of scar injuries and contractions, a 5 per cent solution being employed. There is a caution against the use of fibrolysin in recent scar tissue in which there may be pus. It is regarded as better not to inject directly into the scar tissue (*Fibrolysin*).

As regards other conditions incidental to the war, the article by Dr. Goodall on TRENCH FEVER will be read with interest.

Trench Throat is reported on by Dr. J. S. Fraser (VINCENT'S ANGINA). This affection constitutes 23 per cent of the throat cases in the French Army. Its treatment is very fully considered.

Tropical Diseases.

The enormous saving of life which has resulted from the skilled treatment of tropical diseases has not been sufficiently realized. It is a result of which our profession may be reasonably proud. Sir Leonard Rogers again brings our knowledge up to date on this important subject (see Special Articles). Continued good results are recorded from the use of emetine in AMŒBIASIS. In non-amœbic cases of DYSENTERY, Finlayson strongly recommends antidysenteric serum intravenously.

Oil of chenopodium has proved of particular value in ANKYLOSTOMIASIS in doses of 6 min. three times a day. In the treatment of CHOLERA in Mesopotamia, hypertonic saline proved of much benefit. FILARIASIS has been completely cured by a single injection of salvarsan. KALA-AZAR (Leishmaniasis) has been treated with success by tartar emetic, used by intravenous injection.

Sir Leonard Rogers describes an improved method of using chaulmoogra oil in LEPROSY. He has also suggested the intravenous injection of tartar emetic in certain stages of MALARIA. Liquor arsenicalis has also been recommended as an addition to quinine in the treatment of this disease. Good results have been obtained in PLAGUE by the intravenous injection of 5 to 7 min. of tincture of iodine once or twice a day. The view has been expressed that YELLOW FEVER may in time be completely eradicated. This is based on the brilliant results already obtained.

Respiratory Disease.

In the article ASTHMA, Dr. A. Latham mentions a new treatment by the injection of a solution of peptone at intervals of three to seven days. He also mentions the use of optochin (ethylhydrocuprein) in cases of *pneumonia*.

In Bronchopneumonia of Children, Dr. Fredk. Langmead describes the use of a subcutaneous injection of quinine hydrochloride which appears to yield satisfactory results. In whooping-cough, the results from bromoform have not been satisfactory. During the later stage moderate doses of potassium iodide appear beneficial.

Digestive System.

A method of treating Gastric Ulcer while the patient is ambulatory is described in Dr. Robert Hutchison's report. As in many cases absolute rest is impossible, the suggestions are valuable.

Dr. E. Wyllys Andrews, in his article Stomach and Duodenum, Surgery of, says surgeons have become more hesitant about operating in cases of gastric and duodenal ulcer. The mortality from operation is from 5 to 10 per cent, and this is considered a tremendous risk to take in a disease which often gets well spontaneously.

In the treatment of constipation, Dr. Robert Hutchison reports two very practical papers (Constipation). Much attention has been directed to the value of abdominal massage.

Dr. Hutchison also points out (Appendicitis) that there are signs of a reaction against the rage for removing the appendix for all sorts of abdominal conditions. We have seen ourselves a large number of cases diagnosed as recurrent appendicitis which are due to the passing of thickened bile through the duct, and which frequently causes reflex pain in the region of the appendix. We mention a treatment which we have found specific in such cases (Appendicitis, Chronic). Dr. E. Wyllys Andrews has also a note of caution against the removal of the 'chronic appendix' (Appendix, Surgery of).

Gynæcology.

Dr. Wm. E. Fothergill reports respecting the scopolamine and morphia method of producing twilight sleep during labour. The general opinion is that it will find its greatest use in institutions specially adapted for the purpose, and in the hands of physicians who can give their whole time to the work. The extensive use of pituitrin in labour is said to be dangerous to both mother and child (Labour).

The extract of corpus luteum appears to have good results in Dysmenorrhœa, and also in control of the nausea and vomiting of pregnancy. For Vaginitis the routine use of sulphur ointment is recommended.

It is stated that the restricted diet in Germany has greatly diminished the number of cases of eclampsia. The 'Rotunda' method of treating this disorder is described (Pregnancy). Glonoin (syn. nitroglycerin) and veratrum viride have been used with success in the treatment of high arterial tension in pregnant women.

Syphilis and Gonorrhœa.

Dr. C. F. Marshall (Syphilis) shows that during recent years too much importance has been attached to laboratory diagnosis, to the neglect of clinical practice. This is also true in other departments of medicine. The Wassermann reaction is influenced by the presence of mercury and arsenic in the system; it affords only a presumptive evidence of syphilis, and is sometimes negative when the clinical symptoms of secondary syphilis are obvious. The luetin test is regarded as more specific, but is of little value when potassium iodide has been taken. The War Office scheme for the treatment of syphilis is fully described, and the results are given.

In the French military hospitals, where 93,000 injections have been made, preference is given to neosalvarsan and novarsenobenzol, as the technique is simpler. The electrolysis treatment of Gonorrhœa is finding increasing favour. The intravenous injection of gonorrhœal vaccine is said to have no specific action either as a diagnostic or therapeutic agent.

The special articles on Syphilis of the Nervous System and on General Paralysis, by Dr. Ramsay Hunt, should be also consulted.

Fevers.

The warm, saturated air of an ill-ventilated room aids infection and diminishes resistance to the bacteria in cases of Cerebro-spinal Fever. Efficient ventilation is an important prophylactic. Early lumbar puncture with washing the spinal canal with $\frac{1}{2}$ per cent carbolic acid in normal saline solution, and the daily use of a serum specific for the prevalent strains of meningococcus, appears to be the most hopeful treatment. A special article on Lumbar Puncture by Dr. Ramsay Hunt should be consulted.

For Diphtheria carriers a powdered antimicrobic insufflation is recommended, and the formula is given.

Dr. E. W. Goodall reports the Goulstonian Lecture on Paratyphoid Fever. The large number of varieties are described, and the appropriate treatment is indicated. In Polyneuritis

(acute febrile), a disease which is attended with fever and rapidly-developing flaccid motor paralysis, involving the facial muscles and deglutition, and sometimes the ocular muscles and the sphincters, diaphoresis and diuretics appear to be of some help.

Trench Fever has formed the subject of several papers, and the fact that it can be conveyed by lice seems to be proved. The incubation period may vary from fifteen to twenty-five days. A vaccine of *enterococcus* has yielded good results in some cases.

In Typhoid Fever, and also *paratyphoid*, intramuscular and intravenous injections of *peptone* have been used with benefit. Directions are given in Dr. Goodall's article. Colloidal gold has also been used in both conditions. It is claimed that the duration of the attack is shortened, but improvement is gradual. An abortive treatment by large doses of typhoid bacilli has been advocated. The 'high-calory diet,' instead of the usual milk diet, finds increasing favour.

In Typhus Fever an antitoxic serum has proved of great value in treatment. A vaccine of *B. typhi-exanthematicis* has been used with success as a prophylactic.

Skin Diseases.

Under Dermatitis, Dr. E. Graham Little gives a useful report upon the occupational dermatoses, with their appropriate treatment. There is also an article on Dermatitis Artefacta—in other words, the artificial eruptions produced for purposes of deception. The results, on the skin, of German bombs used in recent air-raids are also described.

A very useful summary of the treatment of Alopecia is given. Remarkable results appear to have followed the use of radium in cases of Epithelioma or 'skin cancer.' In Erysipelas a 10 per cent solution of iodine painted over the affected part is recommended. For Hyperidrosis, or excessive sweating, the use of a 25 per cent solution of chloride of aluminium in distilled water is advised. For Hypertrichosis, or superfluous hair, a caution is given against the treatment by *x* rays.

In chronic Furunculosis the method of 'sterilization' recommended by Bowen is worth consideration. It is fully described. Impetigo Contagiosa, which is troublesome amongst soldiers, appears to be best treated with sol. hydrarg. perchlor. (1–6000), followed by white precipitate ointment, the treatment being used several times a day. Under the title Pediculosis Corporis,

an excellent article is given on the best means of destroying lice. After careful experiments, crude liquid carbolic soap and soft-soap emulsion is used to impregnate underclothing. The clothes are dipped in the solution, and wrung out and dried before wearing. Full directions are given. Details of the treatment of SCABIES used with success at the 'Front' are given.

In the article, SKIN DISEASES IN WAR, Dr. E. Graham Little reports a very interesting paper by MacCormac, in which the treatment of scabies, ecthyma, linear impetigo, seborrhœa, etc., is given.

Constitutional Diseases.

In Dr. Arthur Latham's report on TUBERCULOSIS, much attention is given to heliotherapy or sun-baths. The frequent connection between syphilis and tuberculosis is also noted. Dr. Langmead mentions, in the article on RICKETS, a treatment which consists in simmering egg-shells for twelve hours and adding the resulting solution to the child's food. In America it is recognized that the greatest cause of SCURVY is the use of pasteurized milk.

Although improvement in health usually follows the operation of splenectomy, there is no evidence that it is a cure for pernicious anæmia (ANÆMIA, PERNICIOUS).

Dr. J. D. Comrie reports an excellent method of distinguishing true DIABETES from glycosuria. It is based on the fact that a diabetic patient is unable to use surplus sugar in the organism. Increased quantities of glucose are given the patient on four successive days, and the results noted. As regards diet, the conclusion has been reached that any attempt at high nutrition, even with fat, is bad, and patients should not be maintained on a luxus level of diet or weight. *Occasional starvation* and *large* doses of bicarbonate of soda are recommended. Vegetable diet tends to check the sugar content of the blood and thus raise tolerance for carbohydrates. Exercise is also beneficial. A special formula for bread substitute is given.

X Rays and Electro-therapeutics.

Great progress has been made in the use of *x* rays for the diagnosis of diseases of the alimentary tract. We give a series of illustrations showing the passage of a bismuth meal in a patient suffering from hour-glass contraction. We have already mentioned the valuable diagnostic

work in the localization of foreign bodies in Mr. Thurstan Holland's article (Radiology and Electrotherapeutics).

Opinion is gathering that in malignant disease the growth presents an increasing resistance to the rays, and that therefore we should commence with the strongest dose and from as many angles as possible. The same appears to be true of radium. Dr. R. Morton suggests that in breast cases the *x* rays should be applied as early as the second day after operation.

In respect to *ionization*, Cleveland questions the value of 'driving in' drugs by the galvanic current, and regards the current itself as alone beneficial.

Mental Diseases.

Drs. Bedford Pierce and Kate Haslam give a very full report of the latest views on Psycho-analysis. Much discussion, not wholly favourable, has taken place respecting Freud's views. In Dementia Præcox it is reported that some success has been obtained by intravenous injections of a 0·9 per cent solution of common salt, which it is suggested may be deficient in the blood of catatonic patients.

In General Paralysis of the Insane, the results of salvarsan appear to be well established if used in an early stage of the disease.

It is suggested that neurasthenia, asthma, and depression are due to chronic infection with the influenza bacillus in association with other organisms such as *Micrococcus catarrhalis* and the pneumococcus, and that their treatment by sensitized vaccines is curative (Mental Diseases). In the same article the use of the continuous bath is mentioned as of high value in controlling excitement. It is perhaps a singular fact that the war has diminished instead of increasing the number of mental cases. This is attributed to the improved circumstances of the majority of the working classes. No new or specific form of insanity appears to have developed amongst those engaged in the war; but there has been much functional neurosis described elsewhere. It is somewhat curious that those with actual wounds usually escape these neuroses.

Malingering forms the subject of a special article by Drs. Bassett-Jones and L. J. Llewellyn. The symptoms usually presented and their differentiation from true disease are fully described.

The article Dermatitis Artefacta should also be consulted.

Pressure on our space has obliged us to leave a very large number of articles unnoticed. Our object, attempted this year for the first time, is to help the reader to the facts which may be of special interest to him. It often happens that information is to be found on the same subject in articles belonging to different departments, and we have tried to help the reader to correlate them both here and in the body of the work.

All our contributors have worked under conditions of excessive strain, and we are very grateful to them for thus enabling us to produce a volume which contains so much valuable information.

The 'Medical Annual' Offices,
Bristol, England, 1918.

THE MEDICAL ANNUAL

Part I.—The Dictionary of Materia Medica and Therapeutics.

REVIEW OF THERAPEUTIC PROGRESS, 1917.

By FRANK J. CHARTERIS, M.D.

Lecturer on Materia Medica and Therapeutics, Glasgow University; Physician to Western District Hospital, Glasgow; Assistant Physician, Western Infirmary, Glasgow.

DICTIONARY OF REMEDIES.

ACACIA.

Hurwitz[1] holds that the symptoms of acute or prolonged **Hæmorrhage** are due in great measure to a diminution in the volume of circulating blood. Experimentally it has been found that saline solution injected intravenously leaves the vascular system much more quickly than a fluid in colloidal combination. Thus, intravenous injections of colloidal gelatin solutions are not diuretic, and maintain a higher and more sustained blood-pressure. Hurwitz, during animal experiment, found that repeated bleedings, followed by the intravenous injection of washed red blood corpuscles in Locke's solution, could not be repeated more than two or three times without producing a great drop in blood-pressure which was frequently fatal. On the other hand, similar injections of corpuscles in Locke's solution containing acacia gum were not accompanied by such a striking loss of pressure, and could be repeated more frequently. This observation suggested the use therapeutically of an acacia-Locke solution to combat the immediate mechanical ill-effects following severe hæmorrhage. Hurwitz uses a Locke solution containing approximately 5 per cent of good gum acacia, producing a fluid with a viscosity of about 2·2, approximating to that of blood plasma, which is 1·7 to 2. The acacia is dissolved, filtered through heavy filter paper (suction being of assistance), and immediately sterilized. The slight alkalinity of Locke's solution neutralizes the acidity of the acacia. In both animal and human tests the acacia-Locke solution has proved useful. It should be given as soon as possible after the hæmorrhage, before exhaustion of the vasomotor centre and cardiac failure. To avoid embarrassing the heart, the fluid should be introduced slowly and in

not too large amounts. The advantages claimed for this method are the retention of fluid in the vascular system, and that acacia is non-protein, simple in preparation, and readily sterilized.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 699.

ADRENALIN.

Milian[1] states that adrenalin is both a preventive and curative for **Iodism,** which he considers, as regards the vasomotor manifestations, is due to suprarenal insufficiency. It is necessary to give fairly large quantities of adrenalin. At least 0·006 grm. a day is required, given in two doses by the mouth, and if this proves insufficient, subcutaneous or intramuscular injections of 0·001 to 0·002 grm. should be given. He records two cases in which the use of adrenalin was successful in removing the symptoms of iodism, which in one case returned on stopping the use of adrenalin.

Nolf and Frederieq[2] record a case of **Addison's Disease** which exhibited a very marked tolerance of adrenalin. During a severe crisis of asthenia and hypotension, when the patient had apparently only a few minutes to live, adrenalin was given along with calcium chloride. At 10 o'clock he received subcutaneously 1 mgrm. of adrenalin, and between 10.30 and 4.30 he was given 9½ mgrm., of which 8½ mgrm. were administered intravenously. The solution used was the ordinary 1–1000 solution of Parke Davis, of which the patient thus received 10½ c.c. in four and a half hours. Despite the large dosage the blood-pressure was not satisfactorily raised, and no glycosuria or acute œdema of the lungs was induced. The patient rallied, and for the remaining nine days of his life he received from 4 to 6 mgrm. of adrenalin daily by subcutaneous injection without any unfavourable result.

REFERENCES.—[1]*Paris Méd.* 1917, May 5 (abstr. *N. Y. Med. Jour.* 1917, i, 1259); [2]*Arch. Méd. Belges*, 1917, Aug., 691.

ALCOHOL.

Tansini[1] warmly recommends 95 per cent alcohol for disinfecting the peritoneum in **Abdominal Operations,** especially in cases where, during surgical intervention on the gastro-intestinal tract, the peritoneum is soiled with escaping gastro-intestinal contents. He uses gauze impregnated with the alcohol to wipe the polluted surfaces clean.

Nogier[2] finds that so-called solidified alcohol is an excellent preparation to use in war surgery for **Cleansing and Disinfecting** wounds, instruments, the operation field, and the surgeon's hands. Solidified alcohol is really a soap with an alcohol base, and combines the properties of these two substances. Thus, it is readily inflammable, and can be used to boil water and sterilize instruments by heat. It dissolves fatty substances rapidly, and cleanses the skin without altering it. To cleanse the hands it is only necessary to rub on a small lump of the alcohol with a few drops of water. It is, according

to his view, incomparably the best method of cleansing the operation field. In a few moments simple friction with solidified alcohol cleans and renders aseptic even the most soiled skin. It is superior to iodine in that it is neither irritating nor caustic. It is very useful for **Cleansing Instruments** soiled with blood or pus. All that is required is to place them in a shallow plate containing a little water and solidified alcohol, rub lightly, and adherent material is promptly removed. After rinsing in fresh water, the instruments are ready for boiling. A simple cheap method of preparing a suitable solidified alcohol is as follows.: Place 500 c.c. of alcohol in a one-litre flask, add 150 grm. of powdered dry Marseilles soap and 12 grm. of shellac, and shake thoroughly. The mixture is then heated on a water-bath till solution is obtained and a deep-brown liquid forms; this, poured into metal moulds, soon sets into a soft buttery paste.

In discussing alcohol and **Fatigue,** Stanley Kent[3] distinguishes industrial drinking from convivial drinking. Industrial drinking is much the more pernicious form. To some extent it is a traditional trade custom to take drink during working hours, but in most cases the reason for taking alcohol is the fatigue induced by labouring for excessive periods in unsuitable surroundings. Fatigue involves physical discomfort, and the worker knows that this discomfort can be removed, at least temporarily, by alcohol. The effect is transitory, and the dose is repeated time after time till alcoholism is established. The taking of alcohol has little immediate effect upon the physical side of fatigue. The output may even be increased slightly for a short time, but soon the effect is to reduce the output. The action is much more profound upon the psychical side of fatigue. It leads immediately to a feeling of renewed vigour and increased strength. But here too the effect is transitory, and to produce lasting effects repeated doses are necessary. From these considerations Kent considers that there is little hope of checking industrial alcoholism by emotional appeals to the victims' better nature. The true cause must be sought in the imperfect conditions of such industry. The conditions determine fatigue, and fatigue induces men to drink. Therefore the true cure for alcoholism is the provision of decent surroundings in factories and homes, adequate wages, leisure and relaxation, clubs, recreation rooms, games—in short, the elements of a healthy, full, interesting life in place of a mere existence without interest, without pleasure, and without hope.

REFERENCES.—[1]*Presse Méd.* 1917, Jan. 7, 336; [2]*Ibid. July* 23, 426; [3]*Lancet*, 1917, ii, 107.

AMMONIUM CHLORIDE.

Coleman[1] has investigated the action of ammonium chloride on the bronchial secretion in patients suffering from acute or chronic **Bronchitis.** An expectorant is a drug which facilitates the expulsion of mucus from the respiratory passages. This may be accomplished by softening and releasing mucus, without necessarily an increase in

the total quantity of the sputum. Experiments on laboratory animals afford little help in solving the problem whether a drug has an expectorant action. Recent experiments have shown that after oral administration of ammonium chloride there is an increase in the urinary ammonia nitrogen, with a fall in urea. Consequently the drug is not simply changed in the liver into urea, as formerly stated. Coleman has amplified our knowledge of the fate of ammonium chloride by showing that after the administration of small doses, from ½ to 5 gr. every two hours, there is a marked increase in the ammonia nitrogen in the sputum. The ammonia-nitrogen reaction of the saliva was always faint. Subjective observations carried out on bronchitic patients showed that, both in acute and chronic cases, the administration of the drug produced distinct loosening of the sputum and lessening of the rough, raw sensation. The taste of ammonium chloride appears in the mouth as the sputum passes. The expectorant action is rapidly produced, but the excretion is prolonged. The most likely explanation is that the drug during or after its excretion lessens the viscosity of mucus, partly through increasing the water of secretion and partly through solvent action, and that then the normal mechanism of removal comes more readily into action. The less viscid mucus is more rapidly carried out by ciliary movement.

REFERENCE.—[1]*Amer. Jour. Med. Sci.* 1916, ii, 569.

ANTIMONY. (*See* TARTAR EMETIC.)

APOCODEINE.

Alvarez[1] has found a combination of apocodeine and atropine a useful **Laxative.** It is not likely to set up a habit, and the dose does not require to be increased with continued use. The laxative effect produced is very mild. The stool is normal and formed, and there is no griping. The combination he advocates is a capsule containing $\frac{1}{15}$ to $\frac{1}{10}$ gr. apocodeinæ hydrochlor., $\frac{1}{200}$ to $\frac{1}{150}$ gr. atropinæ sulph., with 2 gr. sacchari lactis. As a rule one capsule twice a day is adequate.

[This would be more conveniently prescribed in the form of pellet or tablet triturate.—ED. MED. ANN.]

REFERENCE.—[1]*California State Jour. Med.* 1916, Sept. (abstr. *Ther. Gaz.* 1917, Jan., 38).

APOTHESINE.

Apothesine is the cinnamic ester of γ-diethylamino-propyl-alcohol-hydrochloride. It occurs as snow-white crystals soluble in water or alcohol. Allen[1] has used it clinically for several months, and recommends it as a useful **Local Anæsthetic** of low toxicity which gives anæsthesia for about sixty minutes. He uses a ½ per cent solution in 4 per cent sodium chloride, to which 5 drops of adrenalin solution are added for each ounce of the fluid. It produces no immediate or

late irritating action, and does not interfere with the healing of wounds. He has used as much as 4 oz. of the solution, representing 8·75 gr., without noticing any toxic manifestations.

Reference.—[1]*New Orleans Med. and Surg. Jour.* 1917, March, 623.

ASPIRIN.

Fletcher Stiell[1] reports a case of *chronic aspirin poisoning* in a woman, age 50, who for seven years had been in the habit of taking 10 gr. of the drug twice daily for the relief of the pains of rheumatoid arthritis. The first toxic symptom was an intractable conjunctivitis, with a sensation of sand in the eyes. There was well-marked hyperæmia of both palpebral and ocular conjunctivæ, with slight chemosis and considerable lachrymation. It was found that the patient required to continue the drug for the relief of pain, and a week later she gradually became troubled with urticaria, which increased in severity, was continuous, and resisted all treatment. The patient became weak from insomnia, and showed signs of intestinal irritation, with vomiting and diarrhœa. There was massive œdema of the tongue and fauces, causing dysphagia and difficulty in breathing. Vision was obscured by the extreme palpebral œdema. The aspirin was then rigidly withheld, and in seven weeks the urticaria had entirely vanished.

Reference.—[1]*Pract.* 1917, ii, 293.

BARIUM SULPHATE.

Bensaude and Terrey[1] suggest the use of this inexpensive drug instead of bismuth carbonate for **Radioscopic Work.** They use a special form of gelatinous barium sulphate, which is finely divided, free from grit, and has no unpleasant taste. The new preparation is stable, and can be readily sterilized. It gives excellent radioscopic results. [The drug has been thus employed in Bristol for the last four or five years.]

Reference.—[1]*Bull. de l'Acad. de Méd.* 1917, Jan. 16.

BATHS.

Danzer[1] advises the continuous bath in the management of **Arthritis Deformans** and **Paralysis Agitans.** The daily bath lasts two hours, and is omitted every seventh day. After thirty baths have been given, an interval of one month is allowed, and then the bath treatment may be resumed. The paralysis agitans cases were treated in a well-ventilated room with water at 92°, and the arthritis cases in a warmer room with the water at 98°. During the first half-hour of the bath there is a slight fall in blood-pressure, and a slight increase in pulse and respiration, which soon fall to normal. In **Arthritic** cases, even in advanced forms, rapid relief of pain is obtained, and joint movement improves, while muscular rigidity diminishes. In **Paralysis Agitans,** the paræsthesias are the first thing to yield to the baths. Muscular rigidity and tremor are also reduced while in the bath. It is necessary to pay attention to the bowels, as constipa-

tion seems to cause the patients to go back. The continuous bath does not cure either paralysis agitans or arthritis deformans, but gives the patients great relief, and improves the symptoms objectively and subjectively. The results are superior to those of drug treatment.

Reference.—[1]*Med. Rec.* 1916, ii, 367.

BLOOD TRANSFUSION.

Gettler and Lindeman[1] have shown that it is possible to increase the alkalinity of the blood by the administration of small doses of alkali given at regular short intervals. They used sodium bicarbonate, 20 grm. every two hours, for eight hours. The alkali is rapidly excreted by the urine, and the maximum accumulation in the blood is thirty minutes after administration. Having thus proved the possibility of raising the blood alkalinity, the authors utilized the procedure in treating a case of **Acidosis** by transfusion of the blood of a donor whose blood alkalinity had been thus increased. The result was very successful. Not only were the immediate results good, but the improvement was permanent. The case was that of a woman in her second pregnancy who developed marked symptoms of acidosis, with excessive vomiting, great emaciation, and profound toxæmia. In the thirteenth week of pregnancy the uterus was emptied, but despite this the acidosis increased. Fourteen days after the operation the pre-alkalinized blood of the lady's husband was transfused by the syringe method. For sixteen hours before the transfusion he had taken 20 grm. $NaHCO$ every two hours. She was bled to the extent of 400 c.c., and then had an infusion of 1100 c.c., together with 400 c.c. of Locke's solution (*see under* Acacia). She was then fed every two hours, and had soda solution rectally every four hours. She vomited only three times in the next twenty-four hours. A second transfusion of 760 c.c. was made six days later.

Heyd[2] has had a moderately extensive experience embracing all methods of transfusion, and concludes that for nearly all practical purposes the citrate method places transfusion upon a simple, efficient basis, and brings its practical application within the range of most practitioners.

In considering the conditions in which transfusion may be reasonably expected to bring about cure or to prolong life, he places first **Acute Hæmorrhage**—from trauma, in gastroduodenal ulceration, in typhoid fever, in ectopic pregnancy, and after surgical operations. The most favourable time for such transfusion is not during the acute bleeding, but some time after it ceases, which in most cases occurs before the mortality line is reached.

His second indication for transfusion is where blood is needed for chemical purposes. In this group he includes transfusions for **Hæmorrhagic Diseases**— hæmophilia, pernicious anæmia, purpura hæmorrhagica, leukæmia, etc. In hæmophilia, transfusion has been successful in a large percentage of cases, and is one of the best means we have for bringing about cessation of the hæmorrhage. In

pernicious anæmia, he has seen only temporary improvement after transfusion. In secondary anæmia, as from nephritis, heart disease, and endocarditis, transfusion is of distinct value. Repeated doses of 200 to 250 c.c. of fresh blood, in well-defined secondary anæmia with general impoverishment of the body, provide an intense activator of the hæmatopoietic system. The blood thus supplied does not live longer than a week or ten days, but such patients show two well-defined clinical reactions: within the first forty-eight hours there is a very marked rejuvenation and sense of well-being, and then in a week or ten days a secondary marked reactive hæmatogenesis occurs. In these cases the most benefit is obtained with small transfusions repeated every three or four weeks.

His third indication is in the case of **Chronic Septic Conditions,** such as chronic suppurative osteomyelitis, chronic pyelonephritis, and chronic endocarditis due to the *Streptococcus viridans*. Transfusion is useless in acute sepsis, but seems of value in these chronic types.

His fourth 'specific' indication is in **Carbon Monoxide Poisoning** and **Methæmoglobinuria.** He has seldom transfused for shock, and by the time his preliminary blood tests had been worked out the patients had either recovered or died. Neither is he impressed with the results of transfusion in diabetic coma or cancer, but in **Cholæmic Bleeding,** and as a prophylactic measure against such bleeding, he has seen satisfactory results.

As regards donors, he prefers healthy young adults between twenty and thirty years of age. In New York transfusion is now so popular that professional donors are available, and he prefers such donors. It is necessary to exclude the possibility of syphilis and malarial infection. Discussing hæmolytic and agglutination tests, he states that whenever possible he prefers to use such laboratory tests, but the results are not absolutely trustworthy. Sometimes, when the tests indicate unsuitability, the clinical test shows that no bad results attended transfusion. In transfusion for acute hæmorrhage, the dangers of hæmolysis or agglutination are almost negligible, for it has been found that bloods which are grossly incompatible give well-defined symptoms even during transfusion, and these occur sufficiently early to prevent irreparable damage being done. In anæmias secondary to chronic infection or low-grade septicæmia, the selection of the donor is of great importance, as a series of transfusions is required. His practice is to immunize the donor against the specific germ before using the blood.

His preference for the citrate over the syringe method is stated as follows. There need be no direct intercourse between donor and patient. Technically it is much easier to perform, and does not require the high degree of co-ordinated team work necessary for successful syringe work.

Other writers who advocate the citrate method are Stansfield,[3] Bernheim,[4] Sydenstricker, Mason, and Rivers.[5] Roy McClure[6] and

Dunn[7] have extensively used Lindeman's syringe method, and Unger also gives unmodified whole blood by means of a special syringe apparatus. The essential part of the apparatus is a two-way stop-cock connected to two syringes, one to contain blood and the other saline solution. With the stop-cock in one position the blood syringe sucks up blood from the donor through a cannula in a vein; at the same time the saline syringe is put in communication with the cannula in the recipient's vein. With the stop-cock reversed, the blood syringe communicates with the recipient's cannula and the saline syringe with the donor's cannula. In use, the blood syringe is filled with donor's blood, and then this blood is injected into the recipient. The cannula not in use for blood is continuously flushed with saline solution to prevent clotting. As an additional precaution an ether spray is used to keep the blood syringe cool. Unger claims that with direct transfusion of unmodified blood the chills which follow the infusion of citrated blood are avoided. The blood is only outside the body for five to ten seconds. The blood can be transfused more quickly than by any other method, and yet the rate can be varied at will. The technique is easy, and no blood is wasted. In eighty-five transfusions by this method no chills occurred when compatible blood was used, but there were eight patients who showed febrile reactions. In McClure and Dunn's[7] series of 150 transfusions on 80 patients, mainly carried out by Lindeman's syringe method, chills occurred in 10 per cent of the transfusions. According to Bernheim, chills varying in severity from a slight sensation of cold to a terrific shivering and shaking, occur within half an hour in 22 per cent of sodium citrate transfusions. He states that in his experience with whole blood transfusion only 2 per cent of the cases showed chills. Despite the severity of the chills after the citrate method, he does not think that they endanger the patient in any way. During the reaction the temperature may rise abruptly as high as 104° to 105°, and as abruptly fall to normal. He has never seen more than one chill after a transfusion, and the whole phenomenon is over in three or four hours. He has never noticed the slightest harmful effect upon the future course of the illness or the progress of the patient. He says the occurrence of citrate chill must not be taken too seriously. It is an unfortunate occurrence, but does the patient no harm, especially as it almost invariably comes on after the transfusion is completed. Stansfeld noted rigors in 10 per cent of his cases, and fever in 25 per cent after transfusion by the citrate method.

Fullerton, Dreyer, and Bazett[8] have used direct blood transfusion in **Military Surgery.** The method they employ is the introduction into a suitable artery of the donor of a cannula which is connected by a short length of rubber tubing, coated inside with paraffin, to a cannula in the vein of the recipient. It is not possible by this method to determine accurately the amount of blood administered, but a fairly safe guide is the onset of anæmic symptoms in the donor, which in healthy men occur after the loss of about 1000 c.c. ($1\frac{2}{3}$

pints). During the infusion the donor complains of nothing abnormal for ten to twenty-five minutes, when the rather abrupt onset of faintness, pallor, and thirst indicate that the transfusion should be stopped. To detect these symptoms early the donor's head should be raised slightly. The symptoms soon subside, and never cause anxiety. The symptoms in the recipient that call for cessation of transfusion are rigors, præcordial pain, increase in pulse-rate, and failure to improve in colour though blood is actually flowing into his vein.

This paper makes no reference to preliminary blood tests before transfusing, to determine the compatibility of the blood. In one of their cases, within two minutes of starting transfusion the patient complained of feeling cold, and shivered. Later he had præcordial oppression, his pulse began to fail, and he became more pallid than at the commencement. The transfusion was stopped, but the patient gradually sank, and died in twenty minutes. The post-mortem examination failed to reveal any lesion, and the authors describe death as probably due to a serum reaction.

Roy McClure and Dunn also record two cases in their series of 152 in which transfusion probably caused death.

Practically all the American authorities insist upon the necessity of preliminary blood tests to ensure compatibility between the donor's and recipient's blood. The present practice is to carry on the test far longer than was formerly done, and it is now advised to allow the test to stand for at least an hour before examining it. Several writers state that this preliminary testing does not entirely clear up matters. It has been noted that recipients who have received several injections become more difficult to match. In several instances it is recorded that a blood previously compatible becomes incompatible later on when it is proposed to use it again. Possibly this is due to the development of iso-hæmolysins.

Bernheim,[9] in discussing the limit to which bleeding may be allowed to go without transfusion, states that each case is a study by itself. No universal rule is applicable. A sudden loss of blood is more serious than a gradual depletion. A falling blood-pressure is always a warning of value, provided that it is not simply nausea that is the cause. In cases of severe hæmorrhage—from whatever cause—it is a good working rule to transfuse if the blood-pressure falls as low as 70 mm. of mercury. His further advice is to transfuse when in doubt in acute hæmorrhage. In the **Chronic Anæmias** it is well not to delay transfusion too long. The fresh blood does not cure these conditions, but in pernicious anæmia it generally will cause a remission after all other methods have failed. If drugs have produced one or two remissions, transfusion should be done comparatively early, as a continuously falling hæmoglobin is a danger signal.

References.—[1]*Jour. Amer. Med. Assoc.* 1917. i, 594; [2]*New York Med Jour.* 1917. ii, 57; [3]*Lancet*, 1917, i, 488; [4]*Jour. Amer. Med. Assoc.* 1917. ii, 359; [5]*Ibid.* 1917, i, 1677; [6]*Canad. Pract. and Rev.* 1916. Oct., 416, [7]*Johns Hopkins Hosp. Bull.* 1917, 100; [8]*Lancet*, 1917, i, 715; [9]*Amer; Jour. Med. Sci.* 1917, i, 575.

CALAMINE LINIMENT.

Pusey,[1] to overcome the drying effect of simple calamine lotions, recommends the exhibition of the drug in the form of a liniment. He advises tragacanth as the emulsifying agent, and gives the following formula: Powdered tragacanth, 1 dr.; phenol and glycerin mixed, of each, 10 min.; zinc oxide and calamine, of each, 1 oz.; olive oil, 4 oz.; water to 1 pint; and 20 to 50 min. of oil of bergamot. The result is a smooth, pink, permanent, thick, creamy emulsion which is a very agreeable, soothing, oily application. It usefully replaces calamine lotion, and is useful in the form of wet dressings. When smeared on the surface it leaves a coat of powder, slightly oily. Though it does not afford as much protection as an ointment, it is more easily applied over large surfaces. It may be used as a vehicle for other common remedies, as resorcin, salicylic acid, sulphur, ichthyol, corrosive sublimate. The addition of a few drops of ichthyol, 10 to 40 min. to the pint, makes the colour similar to that of the skin. A useful mixture for extensive itching dermatoses is made by mixing 20 to 30 min. of camphor-phenol, and 30 to 60 min. of camphor-chloral, with 1 pint of the calamine liniment.

Reference.—[3]*Jour. Cutan. Dis.* 1916, Dec., 826.

CALOMEL. (*See* Mercury.)

CEPHAELINE.

Simon[1] states that this alkaloid of ipecacuanha is as active an **Amœbicide** to the free entamœba as emetine, while its effect upon the encysted organism seems more promising. Given hypodermically, cephaeline causes more irritation and pain, and gastric disturbance is more frequent, but there is less tendency to diarrhœa, than with emetine. The dose is about the same as emetine.

Reference.—[1]*New Orleans Med. and Surg. Jour.* 1916, Dec.

CHENOPODIUM OIL.

Maurice Hall and Winthrop Foster[1] discuss the **Anthelmintic** action of chenopodium oil. They state that it is highly effective against **Ascarids**—more so in a single dose than any other drug they have tested. It should be given in, and followed by, castor oil, the drug being administered on an empty stomach, which affords the maximum therapeutic action and the most protection to the patient from the local and systemic effects of the drug. Their experiments carried out on dogs showed that it removed nearly all the worms present. Chenopodium is distinctly constipating, and markedly decreases the tone of isolated segments of intestine. It slows the heart, reduces blood-pressure, and depresses both rate and amplitude of respiration. Possibly the depressant action is also produced on the musculature of ascarids, rendering them unable to resist the action of purgatives. At the same time the constipating action of chenopodium renders the host more liable to absorb the drug, with local and systemic disturbance. Hence the necessity of administering an efficient purge

with the anthelmintic remedy to prevent absorption. The anthelmintic action of chenopodium is increased by castor oil. The best plan is to administer 1 oz. of castor oil at the time the chenopodium is given, followed by the same amount in from half to one hour afterwards.

Contant[2] uses chenopodium oil in treating **Uncinariasis** in preference to thymol, as the chenopodium causes less disturbance, and is readily taken by the patients, who usually object strongly to a second course of thymol. Using 10-min. doses in capsules, the oil is given for three consecutive days half an hour before a light breakfast. The last dose on the third day is followed in two hours by a dose of salts or castor oil. Complete cures were obtained in 40 to 45 per cent of cases after one such course of treatment, in 70 to 75 per cent after two courses, while after three courses from 85 to 90 per cent were cured. He met with a toxic action in 1 out of 300 cases treated with chenopodium. The young man was suffering severely from uncinariasis, and was very anæmic and weak, and had had recently recurrent malarial fever. After two doses of 10 min. on successive days, he was suddenly seized, in the afternoon of the second day, with severe griping cramp-like pain in the abdomen, with vomiting, headache, twitchings, and tremors. The temperature rose to 102°. The patient became quite collapsed and irrational. Restoratives and cardiac stimulants were administered, and 5 gr. of calomel as a purge, which produced a blood-stained stool containing much mucus and many hookworms. Next morning there was a similar attack, but in the course of the next two weeks the patient gradually recovered.

Salant and Bengis[3] find that chenopodium oil by the mouth or subcutaneously causes renal irritation in rabbits fed exclusively on oats, but not when fed on carrots. Other fatty oils—cotton-seed, castor, olive, and cocoanut oils—have a similar irritant effect upon the kidneys when given by the mouth. The authors think that possibly the irritant action is in some way bound up with the products of hydrolysis, e.g., glycerin, causing local irritation and congestion, thus favouring the absorption of poisonous products from the intestine.

References.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 1961; [2]*Ibid.* 1916, ii, 1599; [3]*Jour. Exper. Pharmacol.* 1917, June, 529.

CHLORAMINES.

Dunham and Dakin find that a fine spray of 0·5 per cent watery solution of chloramine-T (sodium-toluene-para-sulphochloramide), with NaCl added to render it isotonic, is of considerable power in reducing the number of **Bacteria in the Nasal Secretions.** The fine spray does not precipitate albumin, and cleanses the parts well. The remedy requires to remain in contact for about half an hour, which is a disadvantage. Accordingly they prefer to use dichloramine-T (toluene-para-sulphochloramide), which is dissolved in eucalyptol to ensure a longer action. A reasonably bland oily solution can be obtained by dissolving 0·2 grm. dichloramine-T in 2 c.c. of chlorinated

eucalyptol without heating. When completely dissolved, 8 c.c. of chlorinated paraffin oil is added, and a solution containing 2 per cent of dichloramine is obtained. It is used as follows: The nose is cleaned with salt solution or a 0·25 per cent aqueous solution of chloramine-T, either by spraying or irrigation, a handkerchief being used several times. After the augmented nasal secretion has subsided, the nose is thoroughly sprayed with an oil atomizer with the 2 per cent oily solution of dichloramine-T. As it is not certain that the dichloramine remains active after two hours, it is recommended to repeat the spraying at two-hourly intervals, about four oil treatments being given in the day. The first few applications are liable to cause sneezing, but tolerance is soon obtained, and subsequent applications cause no inconvenience. The authors hope that such local applications will prove useful in the case of nasal carriers of diphtheria, the meningococcus, etc.

Reference.—[1]*Brit. Med. Jour.* 1917, i, 865.

CHLORINE.

Halldorson[1] has been administering the U.S.P. solution of chlorine internally for a number of years, and believes that it is a useful remedy in (1) **Pneumonia** when the urinary chlorides are scanty; (2) **Acute Tuberculosis** during the early stage of infection, or when due to an acute spread of the disease from the breaking down of an old focus; (3) **Anæmia and Malnutrition of Children** due to latent tubercle; (4) Certain cases of **Summer Diarrhœa** in children, with high fever, great prostration, and restlessness. He gives from ½ dram to 1 oz., and conceals the unpleasant taste by combining it with cod-liver oil emulsion. In pneumonia he gives a ½ oz. every three or four hours of a mixture of equal parts of liquor chlori and cod-liver oil emulsion. Children under four years may get up to one teaspoonful of the same mixture. For children under one year of age the dose is 20 min. of the chlorine solution in double the quantity of emulsion.

Reference.—[1]*Journal-Lancet*, 1916, Oct. 15 (abstr. *Ther. Gaz.* 1917, Jan., 48).

CHLOROFORM.

Hall and Foster[1] state that chloroform is the most efficient and safest remedy for **Hookworm Disease.** It is less effective against ascarids and whipworms. Their experiments were carried out on dogs, and they find that chloroform given internally in castor oil is well borne and causes no serious disturbance. The amount given is not stated, but seems to be about 3 to 4 grm., dissolved in castor oil.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 1698.

CHOLIN CHLORIDE.

Loeffler[1] finds the injection of cholin chloride of some use in the treatment of **Scar Injuries** and **Scar Contractions.** He injects 10 c.c. of a 5 per cent solution. The injected area is immediately treated with hot applications, and an hour later a hot-air bath, lasting half

an hour, is used. This is followed by energetic massage of the scar, and active and passive movements. The hot air and massage are repeated thrice daily. During the intervals the scar is kept warm by a thermophore or by thick cotton-wool pads. In five or six days the injection is repeated. This method of treatment is said to be specially valuable in scars adherent to bony prominences, which so often form ulcers on slight trauma. It is also useful when scar-formation in the axilla, elbow, or popliteal space interferes with movements of the joints, and also for restoring mobility when the cicatricial tissue is adherent to muscles and tendons.

Reference.—*Centr. f. Chir.* 1916, No. 45, 841 (abstr. in *Surg. Gyn. and Obst.* 1917, March, 271).

CINNAMON.

Drummond[1] suggests that cinnamon may prove of use as a prophylactic in **Measles** and **German Measles.** He has had a successful experience among a number of children resident in an institution who were exposed to contact with a nurse suffering from German measles. The children were given cinnamon powder in their food —as much as would lie on a sixpence—night and morning, and none of the twenty children in question developed German measles.

Reference.—[1]*Brit. Med. Jour.* 1917, i, 764.

COLLOIDAL SULPHUR. (*See* Sulphur, Colloidal.)

EMETINE HYDROCHLORIDE.

While carrying out pharmacological studies on the ipecacuanha alkaloids, Walters and Koch[1] found that sublethal doses of emetine hydrochloride repeated daily have a *poisonous cumulative action.* The rabbit requires subcutaneously 10 mgrm. per kilo body weight to kill with a single dose, but if 5 mgrm. are injected daily for five days it proves fatal. Obviously the question of such cumulative toxic action is of importance in view of the treatment of dysentery by repeated injections of emetine hydrochloride. These authors refer to several cases in man in which emetine hydrochloride has caused death. Thus, in a case recorded by Rowntree and Levy, a man weighing 69·5 kilos received in nineteen days 1·74 grm., a daily average of 90 mgrm., or 1·3 mgrm. per kilo body weight, which corresponds fairly closely to 1 mgrm. per kilo body weight, the fatal dose for rabbits when given daily for about three weeks. In Snell's case, the patient, a child five years old, received 10·6 gr. in twenty-one days. Two further cases reported by Johnson and Murphy showed that a man, aged twenty-two, received during Aug. 10–19, 9 gr.; Aug. 21–24, 3 gr.; Sept. 5–15, 10 gr.: Sept. 27–Oct. 3, 3 gr.; in all, 25 gr. in forty-four days. The other man, aged thirty-eight, received 1 gr. of emetine hydrochloride daily for twelve and a half days; then, after an interval of five days, ½ gr. daily for fourteen days, followed by four days at 1 gr.: in all, 22½ gr. in thirty-five days. In other non-fatal cases 18 gr. were given in twenty-six days, 29 gr. in

thirty-four days, 25⅔ gr. in twenty-eight days, 22 gr. in twenty-two days. All these patients showed *lassitude, weakness, and extreme exhaustion. Neuritis, muscular tremor, rapid pulse, and diarrhœa* were present in all. Two other cases from the older literature record peripheral neuritis. Walters and Koch suggest that the toxic human dose is 10 gr. for a single administration. The average therapeutic dose of 1 gr. daily for ten to twelve days is fairly safe, as probably the fatal quantity is about 1 gr. for twenty-one days. The onset of lassitude, depression, intensified diarrhœa, lessened reflexes, and perhaps neuritis, are danger signals to discontinue the treatment.

Reference.—[1]*Jour. Exper. Pharmacol.* 1917, July, 73.

ETHER.

Starkey[1] finds a light ether hypnosis of value in **Psychotherapy.** By its assistance it is possible to bring a much larger percentage of patients under hypnotic influence than by the ordinary means of inducing hypnosis. The patient must be carefully prepared, and the etherization must go like clockwork. Light dieting, with a gentle purge, commence the preparation after the patient's confidence is gained. To calm any nervous phenomena, sodium bromide may be administered. Then, in an absolutely quiet dimly-lighted room, a thoroughly experienced anæsthetist gives a few whiffs of ether, very gradually and very gently, so as to produce no resistance. Very little ether is found to cause relaxation, and then, when the mental condition is more or less dazed and hazy, the operator commences his psychotherapy by gently, and gradually more forcibly, assuring his patient that the desired end is being accomplished. The patient finally is made to repeat the suggestion. The whole procedure should not take more than ten minutes, and thereafter the patient is quietly removed to a prepared, quiet, darkened room and kept in isolation. The procedure may be repeated either daily or as often as required.

Reference.—[1]*Med. Rec.* 1917, i, 631.

FIBROLYSIN.

Herse[1] reports about 30 to 50 per cent of favourable results from the use of fibrolysin injections in various **Cicatricial Conditions** met with in war surgery. Its use is dangerous as long as there is the possibility of latent pus in the scar tissue, as active inflammation may be set up again. It is a safe rule never to inject directly into the scar tissue.

Reference.—[1]*Arch. f. klin. Chir.* 1916, cviii. 72 (abstr. in *Surg. Gyn. and Obst.* 1916, i, 165).

FORMALDEHYDE.

This substance is suggested as a suitable remedy for **Destroying House-flies.** Three teaspoonfuls of commercial formaldehyde solution are added to one pint of water and used as follows: An ordinary thin-walled drinking glass is filled, or partially filled, with the solution.

A small plate or saucer, on which is placed a piece of white blotting-paper, cut the size of the dish, is put bottom up over the glass, and the whole is then inverted quickly and a match is placed under the edge of the glass. As the solution in the saucer dries up, the liquid seal at the edge of the glass is broken and more liquid flows out of the glass, keeping the blotting-paper moist.

REFERENCE.—[1]*Ther. Gaz.* 1917, July, 494.

GARLIC.

Perez[1] states that it is common knowledge in Spain that if crushed raw garlic is well rubbed into the axilla a febrile disturbance with indisposition follows. This is said to be taken advantage of by malingerers. Perez suggests that the therapeutic possibilities of raw garlic should be investigated. According to Minchin,[2] garlic is a remedy for many diseased conditions. He considers it a prophylactic for **Typhus, Typhoid, and Diphtheria.** He advises in the first two diseases the trial of 1 dr. of succus allii sativi every four to six hours, given in beef-tea or with syrup. For a child under twelve, ½ dr. in syrup is sufficient. Given early in typhoid fever it will almost abort the disease, and its action as an intestinal antiseptic makes it valuable at any stage of the disease. In diphtheria the constant application obtained by chewing a 'clove' of garlic removes the membranes, reduces temperature, and relieves the patient. About 1 or 2 oz. of garlic can be used in this way in three or four hours. For a week after the membrane disappears, 1 or 2 oz. of the bulb should be chewed daily. The diphtheritic patient has no taste or smell, and merely finds the garlic hot. Used in an inhaler three to four hours daily the succus rapidly relieves the distressing features of **Whooping-cough.** For young infants and children 20 to 30 min. of the succus in syrup every four hours gives rapid relief in early cases. It is of service in **Tuberculosis.** A lotion of 1–6 of the succus is often useful in **Ozœna. Foul Ulcers, Bedsores** and **Sloughing Wounds** are rapidly cleansed and made healthy by local application of the succus either as a 25 to 50 per cent ointment in vaseline or as a 1–4 watery solution. Finally garlic is an excellent stimulating expectorant in **Capillary Bronchitis, Bronchiectasis,** and **Fœtid Bronchitis.** Minchin recognizes that such large claims for any remedy must be looked upon with a certain amount of scepticism, but strongly advises a trial of the remedy, which has the great merit of being harmless.

REFERENCES.—[1]*Med. Press and Circ.* 1916, Dec., 562; [2]*Ibid.* 1916, June 13, 493.

GLYCERIN.

Goodrich[1] states that glycerin more or less completely destroys the antiseptic action of thymol, phenol, boracic acid, and mercuric chloride in aqueous solutions. Glycerin itself is rather a feeble antiseptic, though its osmotic properties enable it to kill protozoa; but many bacteria which resist drying may remain alive in glycerin for hours.

Diluted glycerin is not even preservative, as certain bacteria are arrested in growth by the addition of up to 8 per cent of glycerin to the culture media. Using a standard culture of *S. pyogenes aureus*, pure glycerin required eight hours to destroy all organisms on a cover-slip-film. Mixed with equal parts of water, more than twenty-four hours was required. Roughly, a solution of the following antiseptics in water killed in half the time required for similar solutions in glycerin and water: phenol, mercuric chloride, boracic acid; while in the case of thymol the interfering action was much greater, requiring twenty-four times as long as the similar watery solution. Perhaps the explanation is that glycerin acts adversely by diminishing dissociation. In practice it is suggested that such preparations as glycerin of phenol and glycerin of boric acid should be omitted from the B.P. Glycerin may also account for the unsatisfactory action of many proprietary thymol mouth-washes.

Reference.—[1]*Brit. Med. Jour.* 1917, i, 647.

HALAZONE.

Dakin and Dunham[1] have been investigating the activity of chloramine preparations in order to discover a cheap and reliable method of disinfecting **Contaminated Water Supplies.** They state that halazone, para-sulphone-dichloraminobenzoic acid, appears the most suitable substance of this type. It is cheaply prepared from a waste by-product obtainable from saccharin manufacturers. It is reasonably stable, and can be made into suitable tablets with salt and sodium carbonate, containing 4 mgrms. of the halazone, which are suitable for sterilizing a litre or quart of reasonably heavily contaminated water in thirty minutes. A concentration of 1–300,000 could be relied upon to remove coli, typhoid, and cholera organisms. This concentration gives a just perceptible taste to the water, but it is quite palatable.

Reference.—[1]*Brit. Med. Jour.* 1917, i, 682.

HEXAMINE.

Douglas Guthrie[1] was unable to detect either formaldehyde or unchanged hexamine in the discharges of cases of chronic otitis media or in the cerebrospinal fluid of two patients to whom hexamine had recently been administered. He therefore thinks the use of hexamine in **Aural Suppuration** and in **Meningitis** is irrational. Somewhat disappointed with the therapeutic results of urotropine in urinary disease, Pipper[2] has investigated the antiseptic action of formaldehyde in varying concentrations. He finds that weak solutions promote the growth of both streptococci and staphylococci. Solutions of 1–160,000 still show some power of delaying growth, but 1–320,000 has practically no antiseptic action, while half this strength actually increases the growth of cultures exposed to it. A solution of 1–10,000 seems completely to prevent growth, but anything weaker than 1–20,000 is not able to check growth completely. He questions

whether the urine often contains as much formaldehyde as is represented by this proportion, and thinks that in any case the fact that very weak solutions of formaldehyde promote the growth of bacteria renders urotropine of doubtful value as a urinary antiseptic, as on ceasing to take the drug the urine must at one stage contain only these limited amounts of formaldehyde which will promote growth of germs.

References.—[1]*Brit. Med. Jour.* 1916, ii, 455; [2]*S. Afric. Med. Rec.* 1917, Aug. 11, 228.

HYDROTHERAPY. (*See* Baths.)

IODINE.

Sollmann[1] has investigated the question whether the administration of iodine can result in the appearance of iodides or iodates in the blood. He finds that the iodine is promptly bound through the protein, and any free iodine in the serum is promptly bound as iodide, even in the presence of alkali. Hence the blood on acidulation does not liberate free iodine, as the protein binds the iodine. Further, free iodine cannot be liberated in the body, as all the conceivable reactions for the liberation of iodine from its compounds require much higher concentrations of hydrogen-ion than exists anywhere in the body.

Reference.—[1]*Jour. Exper. Pharmacol.* 1917, Feb., 269.

KEPHALIN.

Cecil[1] finds kephalin gauze very satisfactory as a **Hæmostatic** in perineal prostatectomies. It has, in his work, replaced iodoform gauze, as the packing does not require to be so firm and the hæmostatic action is much more efficient. He has used it in thirty-four perineal prostatectomies. In many cases the urinary drainage has been clear in from four to six hours after operation, and in nearly all cases is clear by the following morning. In only one case was there hæmorrhage on removing the packing. The kephalin gauze is made by dissolving kephalin in ether (about a 5 per cent solution being used) and pouring the solution on gauze strips, which are then rolled and sterilized for ten minutes in the autoclave at 120° C. He also finds a gum coudé catheter, with the terminal three inches coated with kephalin, a very useful assistance in median bar 'punch' operations.

Reference.—*Jour. Amer. Med. Assoc.* 1917, i, 628.

MERCURY.

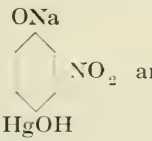
Mercurialized serums have been successfully used in the treatment of **Syphilis.** Such sera are prepared by adding corrosive sublimate to normal serums and dissolving the mercury albuminate so formed in excess of serum. Either human serum from blood, ascitic, or hydrocele fluid may be used, or heterologous serum, such as horse serum. When brought into contact with albumin the latter acts as an acid, displacing the acid radicle of corrosive sublimate, which

then acts as a caustic, and produces local irritation on injection. When dissolved in excess of serum, if any dissociation takes place the acid unites with the albumin of the serum. Such mercurialized serums are therefore not locally irritating when injected subcutaneously or intramuscularly. According to Stewart,[1] it is not known in what form the mercury compound goes into solution. It may be as a mercury albuminate containing sodium chloride, or it may be as a double salt—Na_2HgCl_4—of mercury and sodium.

Pittinger[2] has investigated the toxicity of mercurialized serum, and finds that the local irritant action on injection is removed, but that substantially the toxic action is the same as after using similar quantities of corrosive sublimate. Thus, in his experiments, bloody diarrhœa, salivation, vomiting, retching, and disturbed respiration were observed in exactly the same way as after corresponding amounts of mercuric chloride. The local corroding action is removed, but the general toxicity remains unchanged. This feature indicates that probably the therapeutic activity also remains unimpaired. By the use of mercurialized serum we thus overcome the local disadvantages which follow the injection of corrosive sublimate. Intramuscular and subcutaneous injections are painless, and are not followed by sensitiveness of the part or sloughing. Intravenous injections do not cause phlebitis or local pain. The injection can even be made into the spinal canal, but this is not recommended except in exceptional cases, though Thompson[3] has used this route. Thompson describes the method for preparing an autogenous mercurialized serum as follows: The patient is bled to the extent of 40 to 50 c.c., and the serum which separates is poured off and centrifuged. A watery solution of mercuric chloride is made containing 22 mgrms. in each c.c. The serum is now measured and divided into two portions. To one-third of the serum one-half the volume of the mercuric-chloride aqueous solution is added, giving a heavy precipitate of albuminate of mercury, which is redissolved on adding the remaining two-thirds of the serum. Thus the final product contains 22 mgrms. ($\frac{1}{3}$ gr.) of mercury perchloride in each 7 c.c. of mercurialized serum. It has been found that if the mixture is heated in the water-bath for half an hour at 55° C., the mercury remains in solution indefinitely. Unless heated, the albuminate is reprecipitated. Similarly, mercurialized serum may be prepared from human blood other than the patient's (homologous) serum or of different animals (heterologous) sera. With such heterologous sera there is the possibility of serum reactions when used intravenously or intrathecally. Ascitic and hydrocele fluid may be used also, but vary somewhat in their ability to hold the mercury albuminate in solution. The therapeutic results from the use of mercurialized serum are said to be excellent.

Lautman[4] agrees with Best that the salicylate of mercury has little effect on the Wassermann reaction and slight influence on the disappearance of visible syphilitic lesions. He has tried injecting the benzoate of mercury in an oily medium, and finds that its effect upon

the Wassermann reaction, and the clinical improvement, justify this use. He uses an oily emulsion of ten parts of mercury benzoate and two parts of quinine and urea hydrochloride in one hundred parts of white petrolatum. The quinine and urea hydrochloride is first ground up with a little of the oil in a mortar, and then with careful trituration the mercury benzoate and oil are added in small quantities. A perfect emulsion is obtained, which can readily be aspirated through a twenty-gauge needle. He injects 10 min. (1 gr. benzoate) thrice weekly into the gluteal muscles—not subcutaneously. He advises that the syringe should be cold, lest the benzoate clog it. The injection is followed by a little pain, starting in an hour and lasting for five or six hours, leaving on the following day a feeling of lameness. In twenty-four unselected and previously untreated cases of syphilis a plus 4 Wassermann reaction was made negative in an average of eight weeks.

Schamberg, Kolmer, and Raiziss[5] give a preliminary report on a new organic mercurial compound, for which they claim **Germicidal** properties superior to mercuric chloride. The preparation—sodium oxy-mercury-orthonitrophenolate—is commercially called *mercurophen*. It has the formula  and contains 53 per cent of mercury. An odourless, brick-red powder, freely soluble in water, it forms, when dilute, amber-yellow solutions. It possesses very marked antiseptic properties. Against *Staphylococcus aureus* it is fifty times more active than perchloride of mercury, and destroys the organism on prolonged exposure in bouillon in dilution of 1–10,000,000. In ascitic fluid against *S. aureus*, mercurophen is 200 times more germicidal than mercuric chloride. By the Rideal-Walker method, it is 10,000 times more germicidal than phenol, and over 30 times more than perchloride of mercury against *B. typhosus*. In dilutions of 1–10,000 to 1–40,000 the hands are sterilized in one minute. It is ten times more active than perchloride in sterilizing infected rubber tubing, and ordinary rubber tubing is sterilized by immersion for thirty minutes in a solution of 1–100,000. A solution of 1–5000 sterilizes fæces in thirty minutes. Such solutions do not corrode metallic instruments, and the precipitating effect on albumin is four or five times less than that of perchloride of mercury. Injected intravenously, mercurophen is less toxic than mercuric chloride.

Edward J. Brown[6] has used *calomel fumigation* for the local treatment of **Syphilitic** and **Septic Conditions** of the upper air-passages and nasal accessory sinuses. The fumes from vaporization of any mercurial salt are more or less irritating to the throat and bronchi; but by using the minimum of air, such irritation is avoided, and efficient doses can be given in sittings of from ten to twenty minutes.

Heating by means of a Bunsen flame, with the salt inclosed in a small glass phial incased in 3-in. section of iron tubing of half-inch bore, fumes are given off from calomel within three minutes, and 15 gr. of calomel will have disappeared in forty-five minutes. Calomel is the most readily volatilized preparation of mercury, but its fumes are rather more irritating than those from volatilized grey powder and yellow oxide. In specific cases rapid improvement was obtained by the calomel-vapour inhalations. No details are given, but in one case it is stated that calomel fumigation for ten to twenty minutes daily were given, and healed two small ulcers at the base of the uvula and a mucous patch. Fumigations and insufflations of calomel powder, either pure or as a 5 per cent mixture with boric acid or a 25 per cent calomel-kaolin powder, were useful in chronic suppurative conditions of the nasopharynx, such as **Ethmoiditis** and **Antrum Suppuration.** While testing the irritating properties of various vaporized mercury salts the author cured a long-standing antrum discharge with ethmoiditis.

References.—[1]*N. Y. Med. Jour.* 1917, i, 121 ; [2]*Ibid.* 161 ; [3]*Ibid.* 123 ; [4]*Med. Rec.* 1917, i, 60 ; [5]*Jour. Amer. Med. Assoc.* 1917, i, 1458 ; [6]*Laryngoscope*, 1917, Mar., 181.

MILK.

Dimitry[1] has used non-specific proteins with success in the treatment of **Trachoma, Interstitial Keratitis,** and **Gonorrhœal Conjunctivitis.** He employs cow's milk, boiled for five to ten minutes, which is injected at intervals of four to five days into the gluteal region in doses of 5 c.c. Subconjunctival injections were also employed. In most cases there was a febrile reaction, the temperature rising to 100° or 101°.

Dziembowski[2] has also had encouraging results from the parenteral intramuscular injection of 5 c.c. boiled milk, especially with **Septic War Wounds,** severe **Erysipelas, Tuberculous Bone and Joint Disease,** and in three cases of **Actinomycosis.** In some cases of non-uniting **Fracture,** after the injections consolidation was produced where previously it had been very scanty. A styptic action was noted in bleeding from mucous membranes, and in internal hæmorrhage. In **Psoriasis** it assists the local remedies. The milk is boiled for ten minutes on a water-bath. The injection produces a definite reaction. In a few hours there is a chill, of varying intensity, with febrile reaction up to 102°, which may last some hours. There is also a leucocytosis to 15,000, chiefly involving neutrophiles and large mononuclears. No damage is produced to the kidneys or heart.

Duncan[3] states that the injection of 1 c.c. of the mother's own milk subcutaneously is an excellent **Galactagogue,** very certain in action. The injection is repeated in two days, and if necessary on the fifth day again. It is particularly applicable to cases of recent delivery, in which the supply of milk is quickly diminished.

Saxl, Bruck, and Kiralihyda[4] record favourable results in **Typhoid**

from the intramuscular injection of sterilized milk, and Müller and Weiss[5] have seen marked improvement in **Gonorrhœa** and its complications from the use of the same remedy.

REFERENCES.—[1]*New Orleans Med. and Surg. Jour.* 1917, Sept. 231; [2]*Med. Klinik.* 1916, Nov. 1174 (abstr. in *Jour. Amer. Med. Assoc.* 1917, i, 220; [3]*N. Y. Med. Jour.* 1917, i, 22); [4]*Münch. med. Woch.* 1916, No. 43, 511; [5]*Wien. klin. Woch.* 1916, No. 22, 249.

OLIVE OIL.

From experiments carried out on dogs with gastric fistulæ, Asnis[1] finds that olive oil caused marked reduction in the free acid and total gastric acidity. It was more reliable in this respect than silver nitrate, extract of belladonna, sodium bicarbonate, or bismuth subnitrate. He states that olive oil not only reduces the **Gastric Acidity,** but relieves **Pylorospasm,** and the action is enhanced by the fact that the oil remains longer in the stomach than other drugs. It is contraindicated in dilatation of the stomach and in subacidity and achylia, but is useful in **Acute Ulceration** and hyperacidity with pylorospasm.

REFERENCE.—[1]*N. Y. Med. Jour.* 1917 i, 215.

OUABAIN. (*See* STROPHANTHIN.)

PROTEINS.

Beebe and Williams,[1] discussing the treatment of **Inoperable Cancer** by injection of vegetable proteins, state that they have materially simplified their former method of preparing the protein. They find that the proteins from alfalfa meal, alfalfa seeds, and millet seeds are the most satisfactory. In a flask with a reflux condenser 50 grms. of the seed meal (either alfalfa or millet) are boiled for three hours with 1000 c.c. distilled water and 40 c.c. of 10 per cent hydrochloric acid. The coarser particles are strained out through gauze, the fluid is concentrated to about 200 c.c., and excess of alkali neutralized with 10 per cent solution of sodium hydroxide till faintly alkaline to litmus. The alkaline solution is filtered to remove precipitates and albumin, and the filtrate concentrated to such a point that the nitrogen content, on Kjeldahl determination, is 0·3 per cent. Usually about 100 c.c. is the bulk obtained. The faintly alkaline solution contains alkali albumin, proteose, and a small quantity of peptone. It may be sterilized by boiling, and, to preserve it sterile, is best put up in small glass ampoules. This solution of partly hydrolyzed proteins is stable, non-irritating, and relatively non-toxic. The dose varies, but the initial quantity injected subcutaneously is usually 5 to 8 min., gradually increased to 15 to 25 min. The injections are given either daily or at intervals of two or three days. Anaphylaxis is not severe, and less than with the original solution recommended. The therapeutic effects are a consequence of the marked blood changes. There is increase of hæmoglobin, and red blood cells, both in number, shape, and staining properties, reduction of previous leucocytosis, and marked relative increase in large mononuclear leucocytes. These changes are definite

in character, and are gradually produced in weeks or months, but then persist for a long time even if treatment is stopped. Cases which show most marked clinical improvement show the most decided blood changes.

The cases hitherto treated have usually been advanced inoperable forms, and the degree of therapeutic response cannot be predicted. From personal experience of 500 cases, and written records on about 2500 other cases, the authors give outlines of results obtainable. In about 20 per cent no benefit is seen. In the remainder the following changes are apparent: (1) Diminution in pain, so that morphia can be curtailed or given up; (2) Foul discharges associated with ulcerating surfaces and infected growths, notably of the uterus, are markedly benefited; (3) Improvement in appetite, gain in weight, diminution or complete disappearance of the cachexia and anæmia; (4) Diminution or complete cessation of bleeding from ulcerated growths; (5) Diminution in rate of tumour growth, or its cessation and retrocession, in some cases amounting to complete absorption and seeming recovery. It is not suggested that the treatment by vegetable proteins should displace accepted therapeutic methods, but it is an addition which permits varying degrees of relief for patients to whom other methods offer little or nothing. The treatment must be continued for long periods, and it seems advisable to change occasionally the type of protein administered.

Scully[2] discusses the intravenous use of foreign proteids in **Acute Rheumatic Fever.** He uses a typhoid vaccine made from an active culture grown on agar slants for twenty-four hours, washed off with saline solution, killed by heating to 70° C. for two hours, and preserved by the addition of 0·5 per cent carbolic acid. The vaccine is made to contain 150 million bacilli in a cubic centimetre, and the average dose injected is 0·25 to 0·50 c.c. Unselected cases were treated with the following preliminary precautionary procedure. Before the injection no food is given for one hour, so as to prevent nausea and vomiting. The patient is covered with blankets during the chill, and when the joints are acutely inflamed, $\frac{1}{6}$ to $\frac{1}{4}$ gr. of morphia is injected to relieve any pain likely to be produced by movements during the chill. For three days, after all symptoms subside, the patient is kept in bed. The vaccine is given in the morning.

The general reaction following an injection commences in from half to one hour with a chill, which may be severe, with cyanosis and rapid pulse. While this lasts there may be dull temporal headache, nausea, and vomiting. The chill continues from fifteen to thirty minutes, and subsides gradually, with disappearance of the accompanying nausea and headache. Following the chill comes a rise in temperature, with changes in blood-count and blood-pressure. There is profuse sweating and disappearance of the sharp pain in the joints, though stiffness or soreness may be present for a short time. With a large dose a more severe reaction is seen; the chill lasts for an hour or so, with marked cyanosis and a rapid, weak pulse, and it may be followed by signs

of collapse and profound vasomotor disturbance. Associated with severe reactions, sometimes herpes, vomiting, and prolonged headaches are noted.

A composite temperature chart from twenty-five cases of rheumatic fever shows that the temperature remains unaffected till onset of chill, when it abruptly rises, reaching a maximum of 103·6° four hours after injection; it falls gradually nearly to normal in sixteen hours, and in forty-eight hours the normal level is reached. The composite leucocyte chart shows a fall for the first hour, afterwards a gradual increase till the highest point, about 40,000, is reached six hours after the injection. There is then a fairly rapid fall, and eight hours after injection the count is back to its original number. The blood shows also considerable variations in the differential count. For the first three hours after injection there is a steady increase in neutrophiles, followed by a gradual fall to the former value. The main increase in leucocytes is neutrophilic in character. The urine shows little change. The blood-pressure rises during the chill, then falls, remaining low for two or three hours, and rising gradually to normal.

The therapeutic results of the intravenous injections seem fairly definite. Of twenty-five instances of **Acute Articular Rheumatism**, ten recent and uncomplicated cases, after a single injection, cleared up without known recurrence. Three cases cleared more slowly, requiring two or three injections. The shoulders were the last joints to clear up, some stiffness and soreness remaining. Two cases recurred ten days after clearing up nicely after the first injection, but remained well after a second injection. Four cases showing complications—endocarditis, pericarditis, or emphysema—had temporary improvement only after the injections till put upon salicylates. Four cases resisted vaccine treatment, but were cured under intravenous injections of sodium iodide. The authors claim 40 per cent of successes after a single injection, and 52 per cent after two or more injections. Intravenous injections are contra indicated in the marked cardiac lesions and in chronic alcoholism.

Miller and Lusk[3] communicate a further report on the use of foreign protein in the treatment of **Acute** and **Chronic Arthritis.** They employed a vaccine of typhoid bacilli. The dose used was from 40 to 75 million germs administered intravenously. The authors prepare their own vaccine by usual methods, as commercial vaccines, even in larger doses, do not seem so active. The results obtained appear to be satisfactory, but the very serious reaction is a disadvantage. There is always a very marked rise of temperature, and with few exceptions a marked chill. Headache is severe, and nausea not infrequent. Delirium was noted in three alcoholic subjects. In a few cases there was marked dyspnœa. No fatality has so far occurred, but in five cases it was deemed advisable to discontinue treatment after a single injection. In the present series there were 45 cases of **Acute Arthritis,** of which 33 had previously been ineffectually treated with drugs. Under typhoid vaccine 29 of the 45 patients recovered

promptly, pain, redness, and swelling disappearing in from one to five days, usually within from twenty-four to forty-eight hours. From one to four injections were required to produce these results. Great improvement was shown in 8 other patients, only some slight pain or stiffness remaining ; 6 more showed slight improvement, and 2 gave no response ; 4 of the patients dismissed as cured, and 4 as improved, had recurrences, and of these, 7 were cured or showed marked improvement on reinjection. It is probable that the number of recurrences is even higher than the figure indicates Four gonorrhœal cases showed less improvement from the treatment than those of other origin. In **Subacute Arthritis** the response seems to have been good ; out of 12 cases 10 cleared up in from three to five days after one to four injections ; 2 responded well to the first two or three injections, but subsequent treatment failed to increase the improvement. Of this series of 12 cases, 2 relapsed, 1 recovering after further injections. In another series of chronic arthritis with marked acute exacerbations the acute manifestations disappeared promptly in 8 after one to three injections. **Chronic Arthritis** is represented by 19 cases in which there were definite signs of activity of the disease and no marked ankylosis. In 10 cases, after one to five injections a definite improvement was obtained, acute tenderness and discomfort on movement being relieved. As a rule not all the joints affected were improved. The improvement in several cases was maintained for months ; 4 cases were not benefited, but 5 others showed moderate improvement. In contrast to the acute series, the chronic gonorrhœal cases responded well, 3 out of 5 being cured. On the whole, however, the authors think that in chronic arthritis the results are not very striking. Recurrences are common, and focal infection should be eradicated. Further experience has demonstrated that in simple endocarditis with arthritis the injections control both arthritis and endocarditis.

References.—[1]*Med. Rec.* 1917, ii, 98 ; [2]*Jour. Amer. Med. Assoc.* 1917, ii, 20 ; [3]*Jour. Amer. Med. Assoc.* 1916, ii, 2010.

QUININE.

Prat-Flottes and Violle[1] describe the **Abscess-formation** which sometimes follows the hypodermic injection of quinine. Many cases were noted in the French troops treated at Salonica for malaria. In a typical case, after receiving under aseptic precautions some dozen or so injections of hydrochloride of quinine in the gluteal region, in fourteen days, rarely sooner, a small area of induration is noted. It is painless, and causes neither fever nor general disturbance. In the course of three or four days the part begins to swell, without becoming reddened, and is tender to pressure. In the tissues a hard mass is felt about the size of an egg or orange. Incision at this stage reveals a simple aseptic necrosis of the tissue without any pus-formation. The cellular tissue is most implicated, the skin is intact, and the aponeurotic fasciæ appear normal. Later the fibrous tissues become involved

in the necrotic process, and finally the muscle tissues are affected, small groups mortifying and separating from the sound tissue. Left to itself, pus forms, the whole cellular tissue liquefies, and the skin breaks down. At this stage the condition has passed from an aseptic necrosis to that of a septic abscess infected with organisms; but clinically the course remains as it was before infection, with absence of pain, no involvement of glands, no febrile changes or marked disturbance of the general condition. For removing the local disturbance, as a rule an extensive surgical intervention is necessary, with large deep incisions exposing all diverticula and free excision of the tissue involved. That the necrotic action of quinine is by no means infrequent appears from the statement of the authors that in forty-six cases such surgical treatment gave excellent results.

Barbary[2] states that he has seen 26 cases of quinine trouble after subcutaneous or deep injections of the hydrochloride (14 phlegmons with necrosis of tissue, 8 simple abscesses, and 4 sciatic neuritis.) Barbary therefore abandoned the subcutaneous use of quinine, and found the oral administration ineffectual for military purposes, as too slow in action and uncertain in curative effects. He obtained much more satisfactory results with *intravenous injections* of 0·5 grm. basic hydrochloride of quinine, 1 grm. urethane, in 125 c.c. of physiological serum. These injections are at first given every third day, but after four or five injections the interval is increased to four days. He advises the use of filtered distilled water and chemically pure quinine salt and sodium chloride, to avoid risk of febrile disturbance. The actual injection is made slowly under slight pressure, so that ten to fifteen minutes are required. The patient maintains the recumbent position for at least twenty to thirty minutes afterwards. Even in very severe cases of malaria the therapeutic action is promptly observed. Cases of continued fever which had proved rebellious to quinine administered by the mouth immediately improved, the temperature chart being profoundly altered and oscillating about the normal. In many instances he notes that the diurnal range of temperature is lessened, and that the temperature remains fixed round about 36·9° or 37° C.

Quinine and Urea Hydrochloride.—Wayne Babcock[3] states that strong solutions—33 to 50 per cent—into the skin cause local necrosis through blocking of the circulation, and that the drug is of service in treating **Birth Marks, Angiomata, Warts, Moles,** and **Internal Hæmorrhoids.** The first effect of the local infiltration is an instant burning pain, soon replaced by anæsthesia. The injected area turns white and ischæmic, and necroses, so that in a few days a shrunken black eschar marks the site of inflammation. Round the eschar a troublesome marked œdema develops and does not subside for several days. The eschar is somewhat slow in separating, and the resulting small ulcer is sluggish to heal. If only a very superficial area of the skin is injected, the eschar may not separate till healing is

complete; but if a considerably deeper area is involved in the necrosis, the eschar separates, leaving an indolent ulcer. The scar on healing is often indurated at first, but this feature disappears in time. In spite of these drawbacks, Babcock thinks that this method of treatment is valuable, as, even in very vascular tissue, necrosis is obtained, the persistent anæsthesia is valuable, and the drug is of low toxicity. Further, the convenience of the application, especially on mucous membranes or other inaccessible regions of the body, is useful. The infiltration is carried out with a fine needle, care being taken not to infiltrate too widely. As the chief action is to block the circulation and cause ischæmia, the entire area is infiltrated, or a proximal infiltration is given to cut off the blood-supply.

References.—[1]*Bull. de l'Acad. de Méd. de Paris*, 1917, No. 15; [2]*Ibid.* No. 18; [3]*N. Y. Med. Jour.* 1917, i, 385.

SALICYLIC ACID.

Hanzlik, Scott, and Thoburn[1] state that in **Rheumatic Fever** the total urinary excretion of salicyl is about 15 per cent less than in normal or non-rheumatic subjects. The difference is greater during the first period of administration, i.e., during the first ten to twenty hours. When pushed to produce 'toxicity' the concentration in the blood and urine is again less in rheumatic than in non-rheumatic persons. These results are not due to diuresis, vicarious excretion, or retention of the salicyl, but seem to be due to increased destruction of the drug in the febrile rheumatic organism. The administration of sodium bicarbonate along with the salicylate had practically no effect upon the excretion of salicyl in the urine, nor in preventing salicylism. They therefore conclude that salicylism is not due to acidosis. In another paper[2] they find that the percentage concentration of salicylate in the blood and joint fluid of rheumatic patients receiving full therapeutic doses is approximately the same. In rheumatic individuals the concentration of salicylate in the blood tends to be less than in non-rheumatic persons. There is no demonstrable free salicylic acid in the joint fluid of individuals suffering from rheumatic fever, and even large doses of salicylate do not perceptibly reduce the alkalinity of the blood.

References.—[1]*Jour. Exper. Pharmacol.* 1917, Feb., 247; [2]*Ibid.* Jan., 217.

SOAP.

Reasoner[1] finds that the organisms of **Syphilis** will not live in the presence of a soap solution of even considerable dilution, and that a lather, such as used in shaving, is sufficient, when brought in contact, to cause their immediate death. Probably, a solution of soap or lather used in shaving would be of value as a prophylactic measure against syphilis. Initial lesions on the face, often ascribed to the barber, are probably acquired either by a towel, or perhaps outside the barber's shop, while the minute abrasions left by shaving have not recovered.

Barendt,[2] in an interesting article, discusses the uses and misuses of soaps. The three soaps of the B.P., from a skin point of view, sufficiently meet the requirements of the medical man, as they are pure soaps, which have to conform to rigid tests. When in contact with water, soap undergoes hydrolysis, alkali and fatty acid being set free. The small proportion of alkali attacks the fatty secretion which binds dirt to the skin, forming a soap which, soluble in water, is removed with the dirt. At the same time the fatty acid coming in contact with the cleansed skin softens and smooths it. In doing so it neutralizes any free alkali still present on the skin, thus preventing irritation and reddening. From the skin point of view the question is not how much, but how little, soap should be used to effect cleanliness and well-being, especially in the case of children. Too much soap, while removing dirt, may damage the skin, rendering it brittle, and thus prepare a suitable medium for infectious micro-organisms. Hard water, by fixing the hydrolyzed fatty acid with lime salts, sets free too much alkali, which irritates and roughens the skin. Of superfatted soap it is well to remember that the unsaponified fat remains on the skin, and unless pure and sound the fat may decompose and irritate the skin. They may replace neutral soaps when the water is hard. Sapo mollis, used as spt. saponis alkalinus as a hair-wash, if too searching as an alkali, may be neutralized by rinsing the hair in water containing a little toilet vinegar. He considers soap as misused when employed as a vehicle for medicaments. He attaches no value to medicated soap. Excessive use of soap is apt to leave the skin slightly rough, and in children such patches may become readily infected. Patients confined to bed should not use too much soap: the skin secretion is sluggish, and excessive removal of natural grease leaves the skin rough and branny. Many cases of **Pruritus** without any apparent cause are due to soap. In treating skin conditions, when soap can be resumed it is well to commence with sapo durus, a sound preparation whose action we can gauge and control.

References.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 973; [2]*Med. Press and Circ.* 1917, March, 224.

SODIUM CITRATE.

Lewisohn,[1] discussing the value of sodium citrate as an anticoagulant in **Blood Transfusion,** states that while the addition of 0·1 per cent will not appreciably prevent coagulation, 0·15 per cent and upwards causes the blood to remain fluid for two days. For clinical work, to avoid risk of using too little citrate, he advises the addition of 0·2 per cent sodium citrate to the freshly-drawn venous blood. It is not known how much sodium citrate is required to produce toxic effects in the human subject, but 5 grms. may be introduced into an adult with confidence. Clinical experience with blood infusions containing 0·2 per cent of sodium citrate shows that this proportion is absolutely safe. Lewisohn thinks that, though unnecessary, the proportion of citrate could be safely increased to 0·25 or even 0·3 per cent. It is

advisable to use a large-size needle for collecting the donor's blood rapidly. Care must also be taken to mix the blood and citrate solution in proper proportions, e.g., in one instance 200 c.c. of blood instead of 180 c.c. was mixed with 20 c.c. of 2 per cent sodium citrate. Introduction of the anticoagulant into the recipient's blood does not reduce the coagulation time. Apparently most of its anticoagulant properties are already exhausted in the donor's blood. Clinically in hæmophilic cases it is found that introduction of citrated blood reduces the coagulation time for several hours. Thus in one case recorded by Ottenberg, after injection of 150 c.c. of citrated blood the coagulation time dropped in ten minutes from 80 to 17 minutes, and in twenty-four hours had again gone back to 75 minutes. The same author is stated to have found that the injection of 20 c.c. of a 3 per cent solution of sodium citrate in a hæmophilic patient similarly reduced the clotting time, but in twenty-four hours the coagulation time had become doubled.

Reference.—[1]*Ann. Surg.* 1916, ii, 618.

STOVAINE.

Smith and Hatcher[1] have investigated the toxicity of stovaine in the cat. They find that toxic doses depress the heart when given intravenously, but have no action on the vessels. Poisonous doses kill by inducing immediate and simultaneous paralysis of heart and respiration. Given intravenously, stovaine rapidly leaves the blood, and but little appears unchanged in the urine. There is evidence that stovaine is removed by the liver and destroyed by it. Toxic but non-fatal amounts are rapidly recovered from when given intravenously, and no cumulative effect is seen, so that recovery is complete, and several times as much as the single fatal dose can be given within a few hours, if injected in divided portions at short intervals. Subcutaneous administration is much less toxic than intravenous. They conclude that stovaine is slightly more toxic than novocain, and complete recovery from toxic doses is not quite so prompt as after novocain.

Reference.—[1]*Jour. Exper. Pharmacol.* 1917, Jan., 231.

STROPHANTHIN.

Vaquez and Lutembacher[1] advocate the intravenous use of strophanthin in **Cardiac Insufficiency.** It is necessary to use a suitable preparation to prevent accidents or unsuccessful results, as many of the so-called crystalline strophanthin preparations are variable mixtures of amorphous and crystalline forms, uncertain in their action. They use for preference the crystalline ouabain prepared from *Strophanthus gratus* according to the procedure described by Arnaud. This product is perfectly crystalline, remarkably constant in action, and not more toxic than amorphous forms of strophanthin. They have used it 2000 times without serious disturbance. As an emergency remedy strophanthin is specially indicated in **Acute Dilatation of the**

Left Heart, with **Acute Œdema of the Lungs.** In such cases it is more active than digitalis, especially if preceded by a copious venesection. The intravenous route is the most efficacious method. The dose should be about $\frac{1}{2}$ mgrm. dissolved in 1 c.c. of water. For the first dose it is safer to use only $\frac{1}{4}$ mgrm., followed in twenty-four hours by the larger dose of $\frac{1}{2}$ mgrm., which may be repeated for the next three or four days. Larger doses may produce nausea and even vomiting. Care must be taken to inject inside the vein, as the solution is highly irritating to the extravascular structures. The second clinical indication for strophanthin is seen in cases of **Insuffciency of the Right Heart,** with marked venous congestion, especially of the portal system, which prove refractory to digitalis. With the same dosage as above the clinical results are almost always favourable and sometimes surprising. In many cases strophanthin alone removes the symptoms of cardiac insufficiency, re-establishes diuresis, and removes œdema. In other cases the result is not so complete, and recourse must be had to digitalis; but the peculiar effect is then noted that digitalis, previously inert, now becomes active, as if the previous injection of strophanthin has served to activate the tissues. Further, in other cases, strophanthin injections seem to do no good, but on resuming digitalis treatment it is found that digitalis has regained its power of stimulating the heart. The writers explain this action as follows. Digitalis acts principally on the cardiac contractions, which it slows, and the ventricular diastole, which is increased in amplitude. The effect is produced either by an action on the myocardium, or indirectly through the nervous mechanism. Digitalis has no action on the tonicity of the heart muscle: hence, when tonicity is lost, digitalis may exert no beneficial action. They look upon strophanthin as a remedy acting specially on the myocardium, whose tonicity and powers of contractility it increases. Thus in certain cases of acute dilatation with loss of tonicity of heart muscle, strophanthin alone may remove all the symptoms. In other cases, though it restores the tonicity, it is incapable of slowing the heart and establishing diuresis, but in such cases the re-establishment of tonicity enables digitalis to become active.

Rowe[2] has an interesting paper, in which he shows that strophanthus preparations are markedly more toxic when given hypodermically than when administered orally. Using guinea-pigs as test animals, he investigated the toxic dose of four strophanthus preparations given orally, subcutaneously, and intravenously. The preparations tested were Merck's kombé strophanthin, Merck's ouabain, tr. strophanthi U.S.P., and strophanthone dilute. These four preparations tested on frogs show respectively the following strengths: Kombé strophanthin 100,000 H.T.U. per grm., ouabain 185,200 H.T.U. per grm., tr. strophanthi 1300 H.T.U., and strophanthone 100 per mil. *Table I* shows in a summarized form the results of estimating for guinea-pigs the minimum lethal doses when the drug was administered orally, subcutaneously, and intravenously :—

Table I.

Preparation	Orally	Subcutaneously	Intravenously
	Per grm. body weight	Per grm. body weight	Per grm. body weight
Kombé strophanthin	0·000045 grm.	0.00000045 grm.	0·00000035 grm.
Ouabain	0·00002 ,,	0·0000003 ,,	0·0000002 ,,
Tr. strophanthi ..	0·02 mil	0·000045 mil	0·000025 mil
Strophanthone dil.	0·06 ,,	0·0006 ,,	0·00045 ,,

Table II.—Ratio of M.L.D. of Preparations by Different Methods of Application.

Preparation	Subcutaneous to oral	Intravenous to oral	Intravenous to subcutaneous
Kombé strophanthin ..	100 times	128·6 times	1·28 times
Ouabain	66·6 ,,	100 ,,	1·50 ,,
Tr. strophanthi	44·4 ,,	80 ,,	1·80 ,,
Strophanthone dilute ..	100 ,,	133 ,,	1·33 ,,

Rowe's conclusions are: (1) The subcutaneous and intravenous toxicities of the four strophanthus preparations investigated are from 45 to 100 times as great as their oral toxicities. (2) It has been demonstrated that the satisfactory oral dose is not a true index of the potency of strophanthus. (3) To obtain the most uniform and satisfactory therapeutic results, strophanthus preparations should be administered hypodermically. Extreme caution should be exercised in selecting a sufficiently small dose for subcutaneous and for intravenous injection. Strophanthin for hypodermic or intravenous use is usually placed on the market in 1-mil ampoules containing 1–1000 solutions. For kombé strophanthin and strophanthone dilute, half a mil of each preparation should be sufficient, but ouabain is twice as toxic and requires a correspondingly smaller dose.

References.—[1]*Bull. de l'Acad. de Méd.* 1917, March, 405; [2]*Ther. Gaz.* 1917, Aug., 536.

STRYCHNINE.

Smith[1] states that strychnine depresses the excised frog or rabbit heart, slowing the rate and lessening the amplitude and irritability of the heart. The lessened irritability enables strychnine in sufficient dose to prevent the irregularities produced in the isolated heart by aconitine, ouabain, or occlusion of certain branches of the coronary arteries. On the other hand, irregularities arising from impaired conductivity (cocaine irregularity), or from excessive depression of the myocardium (apocodeine and ergotoxin irregularities), are aggravated

by strychnine. Smith suggests, with the greatest reserve, that strychnine may have a place in the therapy of ectopic beats originating in the ventricle.

REFERENCE.—[1]*Jour. Exper. Pharmacol.* 1917, April, 365.

SULPHUR, COLLOIDAL (*See also* TRENCH SHIN.)

Comrie[1] recommends intramuscular injection of colloidal sulphur in the treatment of **Subacute Painful Conditions of the Muscles and Joints.** The most satisfactory course of treatment consists in an injection every second day for three weeks (10 injections), combined with rest and massage on the intervening days. In the greater number of subacute cases, lasting several months, complete recovery may be expected after three to four weeks from the commencement of treatment. This method is also very helpful in lingering cases of **Gonorrhœal Rheumatism,** but does not replace sodium salicylate in acute articular rheumatism. Commonly there is no local or general reaction, but in some instances the temperature rose about 2° on the day after the injection, and now and then a painful swelling developed at the site of injection, which was, however, readily dissipated by massage. Comrie's work seems to have been carried out chiefly on soldiers suffering from trench rheumatism. The colloidal sulphur was obtained by a chemical process whereby sodium sulphate and sodium sulphide are dissolved in water, white of egg is added, and then weak hydrochloric acid, and the whole is slightly warmed. The preparation is made to contain 1–1000 of colloidal sulphur. The commencing dose is 1 mil, to which are added 2 decimils of 5·5 per cent saline solution to render the mixture isotonic. The injection is made into the painful area of muscle, and if no reaction occurs the dose may be doubled subsequently, the point of injection being slightly varied each time. In a course of 10 injections the affected muscle receives about $\frac{1}{50}$ grm = $\frac{1}{3}$ gr. of nascent sulphur.

Jeanneney[2] records a case of **Chronic Articular Rheumatism** involving the spine, hip, and knee, which was cured by intravenous injections of colloidal sulphur. The injections were given daily for ten days, with a week's interval before the next course of injection. Improvement was gradually produced.

REFERENCES.—[1]*Lancet*, 1917, i, 991 ; [2]*Progrès Méd.* 1917, April 21.

TARTAR EMETIC.

Castellani[1] states that tartar emetic is of great efficacy in **Protozoal Diseases.** It can be considered a specific in espundia granuloma inguinale, kala-azar, and oriental sore. It is useful in yaws, especially when combined with other drugs, and has some beneficial action in **Relapsing Fever.** In **Yaws** he states that a suitable formula for the oral administration of the drug is :—

℞	Antimon. Tartarat.	gr. j	Glycerini		℥ij
	Sod. Bicarb.	gr. xv	(v. Syrup.		℥j)
	Sod. Salicyl.	gr. x	(v. Sod. Tartarat.	gr. x)	
	Pot. Iod.	℥j	Aq.		ad ℥j

This dose, diluted in three or four times its bulk of water, is given thrice daily to natives above 16 years; half doses to children of 8 to 14 and to adult Europeans.

In **Kala-azar,** intravenous injections of a 1 per cent solution in sterilized saline solution can be used in doses of 2 to 10 c.c. daily for five to ten days, then every other day or twice a week. Intramuscular injections are useful, but are followed in a few hours by some pain and localized inflammation. For intramuscular injections he gives the following formula :—

℞	Antimon. Tartarat.	gr. viij	Sod. Bicarb.	gr. ½
	Acid. Carbol.	℥ℓx	Aq. dest.	ad ℥j
	Glycerini	℥iij		

The sodium bicarbonate may be left out, the preparation then being acid instead of slightly alkaline. The dose in either case is ½ to 1 c.c. every other day intramuscularly into the gluteal region.

If it is intended to combine oral administration with intravenous or intramuscular injection, the following mixture is suitable except in yaws, when the addition of potassium iodide is desirable ;—

℞	Antimon. Tartarat.	gr. v	Aq. Chlorof.	℥j
	Sod. Bicarb.	gr. xxx	Aq.	ad ℥iij
	Glycerini	℥j		

1 to 2 fluid drachms in water thrice daily.

[An ointment of tartar emetic, 1 gr. to 1 oz., relieves pain in cases of **Herpes** more rapidly than any other remedy. The strength of the preparation should never be increased.—Ed. Medical Annual.]

Reference.—[1]*Brit. Med. Jour.* 1916, ii, 552.

THROMBOPLASTIN.

Hess[1] states, in a further report on thromboplastin (tissue juice made from brain), that it has proved of practical value in controlling **Hæmorrhage** wherever it can reach the site of bleeding. In true **Hæmophilia** it is almost a specific hæmostatic. He recommends it for local use in bleeding of the new-born, nasal hæmorrhage, and in parenchymatous oozings. Should local applications fail, it should be injected locally, as into the gums after extraction of teeth. Thromboplastin loses little of its efficacy on dilution, and can be boiled for a brief period without suffering much loss of potency. It is innocuous when given orally, and may be tried in bleeding from the stomach and upper intestine. In addition to hæmostatic action the tissue extract possesses healing properties, actively stimulating granulation tissue and hastening epithelialization, and is therefore applicable as a dressing for **Torpid Ulcers** and **Sluggish Wounds.**

Reference.—[1]*Jour. Amer. Med. Assoc.* 1916, ii, 1717.

THYROID GLAND.

It is well known that the iodine content of thyroid glands varies with the histological conditions. Hyperplastic glands are poor in iodine. When iodine is brought to hyperplastic glands by the circulation, or is artificially perfused through the gland, the iodine is almost immediately taken from the blood and stored in the gland. At first this extra store of iodine does not increase the physiological activity of the thyroid, but in the course of several hours both histological and physiological changes are induced. Using Gudersnatch's test on the development of tadpoles, Marine and Rogoff[1] attempted to determine how soon the intact thyroid gland can elaborate its specific iodine-containing hormone when thus supplied with iodine. They find that the histological changes of an involutionary character induced by administering iodine—increase in stainable colloid and shrinkage in the size of the gland cells—are evident as early as twenty hours after the injection of 50 mgrms. of KI into the circulation, and are usually well marked in thirty-six hours. The physiological activity of iodized and control thyroid glands does not show any difference in the first four hours. After eight hours there seems a slight increase in activity, but after sixteen and twenty hours the increased activity on tadpoles is well marked. Thus the storage of iodine in the thyroid from salts of these elements is practically instantaneous, but the elaboration of the active hormone is slow. Iodine in the thyroid gland occurs both in an active and inactive form, and the physiological importance of the mother substance with which the iodine is combined is probably of importance. By alkaline hydrolysis it is possible to split the thyroid substances into their products, which vary in their iodine content and physiological activity. The most active product, 'A,' contains six to seven times as much iodine as the original gland, and is twelve times more active physiologically. But if made from iodine-free hyperplastic thyroid glands, the product 'A' contains no iodine and is inactive. The other product, 'B,' and the residue made from normal glands, contain less iodine than 'A,' and are inactive as tested by Rogoff and Marine[2] on tadpoles. The activity of thyroid preparations runs roughly parallel to their content in iodine, and in the U.S.P. an iodine assay is used as a test for the efficacy of thyroid preparations. This test is not satisfactory, as we have seen above that it is quite easy to increase the quantity of iodine in the gland by feeding iodine or injecting it into the blood-stream. It is even possible to doctor the gland after removal from the body. Such absorbed iodine is inactive till it is worked up into the iodine-containing hormone by the activity of the glandular cells.

Rogoff[3] has taken advantage of the tadpole test to fix physiologically the activity of thyroid-gland preparations. Using tadpoles (larvæ of *Rana pipiens*) of from two to four weeks of age, he feeds them on alternate days with raw liver and the thyroid preparation under test, and observes the changes induced in development of the tadpoles. While the controls show progressive growth, an active thyroid preparation

in suitable doses—20, 10, 5 mgrms.—causes the tadpoles to emaciate, lose their tails, while angulation of the head and the limbs begins to show. He claims that in this way it is possible to differentiate thyroid prepartions which vary 10 per cent or more. He records experiments with several commercial brands which showed marked variations in physiological activity though conforming to the iodine assay.

References.—[1]*Jour. Exper. Pharmacol.* 1916, Oct., 1; [2]*Ibid.* 57; [3]*Ibid.* 1917, Sept., 199.

UROTROPINE. (*See* Hexamine.)

VACCINES.

Bloom[1] believes that the vaccine treatment of **Whooping-cough** is rational and efficient. Large initial doses (500 to 1000 million), with subsequent increasing doses up to 4000 to 5000 million, give quicker and better results. There was slight reaction for the first two or three doses, with fever up to 101° in 4 per cent of the cases, and as a rule the night following the vaccine administration was somewhat more restless and with additional coughing spells; but in a week these sequels disappear. Injections are given every other day till one of the symptoms shows marked remission, then twice a week till cured. The average number of doses required has been seven in a series of forty cases. He claims that the average duration of the disease is shortened to twenty-four days. There is less loss of weight, the intensity and number of coughing spells become less after seven days, and vomiting ceases after one or two weeks. There were no complications and no deaths in his series of cases. The vaccine seems also of value prophylactically. The vaccine used consisted of: *Bacillus pertussis* 1000 million, *Staphylococcus pyogenes aureus* 500 million, *Streptococcus pyogenes* 100 million, *Micrococcus catarrhalis* 40 million, *Bacillus influenzæ* 160 million. The vaccine treatment is contra-indicated in cases suffering from bronchial catarrh or congenital lues.

Emile-Weil[2] records several interesting cases of **Osteomyelitis** secondary to typhoid fever, which were cured rapidly under vaccine therapy with stock cultures, though previously they had proved rebellious to repeated surgical intervention. The therapeutic results were equally good in suppurative and non-suppurative forms, and cures were rapidly produced. Thus a case of costal osteomyelitis, which had lasted for two years despite severe operative interferences, was cured in three weeks, and another case of eleven months' standing, with a history of three unsuccessful operations, was cured inside a week. As a rule two injections were given weekly, increasing amounts of vaccine being used. The dosage is not definitely stated, being expressed not in germs but in fractions of a cubic centimetre. Thus ¼ c.c., then ½, ¾, 1 c.c. are given, and if necessary the treatment is continued with the latter amount. He claims that the therapeutic response is rapid, and there is little discomfort produced—trifling febrile reaction, malaise,

slight gastro-intestinal upset, and only a mild focal reaction in the diseased tissue.

Leake[3] pleads for the better control of therapeutic inoculation, and for the collation of such reliable data as will more clearly guide our future use of the method. In many instances such lack of adequate control is striking. A great part of the unqualifiedly favourable communications on vaccine therapy reporting uniform benefit without severe reaction, bear internal evidence of lack of careful control. He illustrates what might come from scientific investigations of this nature by referring to the Report by Whittington[4] on typhoid fever, and to the work on pertussis carried out by von Sholly, Blum, and Smith,[5] in neither of which series was the benefit claimed for vaccine therapy substantiated. The case for vaccine therapy in general is not proved, and doubt is increasing.

REFERENCES.—[1]*New Orleans Med. and Surg. Jour.* 1917, Sept., 275 ; [2]*Bull. de l'Acad. de Méd.* 1917, No. 3 ; [3]*Jour. Amer. Med. Assoc.* 1917, ii, 631. ; [4]*Lancet*, 1916, i, 759 ; [5]*Jour. Amer. Med. Assoc.* 1917, i, 1451.

RADIO-ACTIVITY AND ELECTROTHERAPEUTICS.

BY

CHARLES THURSTAN HOLLAND, M.R.C.S., Etc.,

Hon. Med. Officer to the Electrical Department, Liverpool Royal Infirmary; President of the Röntgen Society of London, 1904–5 and 1916–17; Captain R.A.M.C. (T.F.), 1st Western General Hospital.

Whilst there is nothing absolutely new to record, during the year many advances have been made and much useful work has been reported.

In an address to the Röntgen Society,[1] the President put forward the claims for the proper recognition of *x*-ray work and electrotherapeutics, and of those working at these subjects, from the two points of view of systematic teaching and the status of those practising these branches of medicine and surgery. The fact was emphasized that whilst in many other countries—America especially—there were professors and lecturers on radiology at universities and medical schools, in England—with the notable exception of Glasgow—no such posts existed. The importance of putting this branch of the profession on a proper footing has been brought into prominence by the War, which has shown the deficiency in experts, and which has necessitated that a large amount of this work should be placed in the hands of non-medical men, many of whom were not even qualified in other ways to attempt this expert work. A further paper[2] shows the general importance of skilled radiography and the enormous ground which it now covers, and demonstrates the need that it should be entrusted to experienced medically qualified men, and to no others. Also that the importance of *x* rays in medicine and surgery is such that it has become imperative, from the point of view of the protection of the public, that all medical students should be taught, and should be examined upon, the principles and practice of radiography. From this it follows that courses of lectures and demonstrations should be initiated in all medical schools and universities.

A definite start to organize the teaching of radiology has been made, and a post-graduate school on a large and comprehensive scale is being initiated in London. The aim of this school is not merely that medical men shall have an opportunity of keeping abreast of modern developments, but that medical men wishing to specialize shall have the opportunity of instruction from expert teachers in all branches of the subject. In conjunction with this scheme, steps are being taken to establish a professorship of radiology at one of the older universities, and to start teaching there on a proper basis. It is intended that

the eventual outcome of these endeavours shall be that a qualification on the lines of the D.P.H. shall be granted after a definite course of instruction and the passing of an examination.

REFERENCES.—[1]*Jour. Röntg. Soc.* 1917, Jan., 1; [2]*Brit. Med. Jour.* 1917, i, 285.

LOCALIZATION OF FOREIGN BODIES, AND WAR RADIOGRAPHY.

It is of interest to note that in America on June 11, 1917, by order of the Surgeon-General.[1] a conference with prominent radiologists was held and a committee appointed to arrange for (1) The proper teaching of radiology for military purposes; (2) The general adoption of the routine *x*-ray examination of recruits—especially as regards the chest; (3) The selection of standard methods of localization to be taught to every military radiologist. It was decided that three methods should be recommended: these are described as the Sutton[2] direct localizing instruments, the Haret[3] or Thurstan Holland[4] method, and the use of the Hirtz[5] compass.

A paper by Flint[6] describes the methods adopted at the Hôpital Français de New York. The chief value of this is the detailed description of twenty-three cases, with full notes and diagrams. In discussing pros and cons for the removal of foreign bodies, stress is laid on the points that: (1) No operation should be performed which does more injury to the tissues than the presence of the foreign body; and (2) Operations should not be performed in clean cases when there is not a reasonable expectation of aseptic healing or a great probability of finding the projectile. He is altogether against the use of *x*-ray plates taken in two directions as being reliable guides for searching for foreign bodies. He also deprecates operating under the screen. He advocates the use of the compass method of localization combined with a 'profondometer'—a band of malleable metal, hinged, and moulded round the part under observation. Localization is done under the screen, and six or eight observations are made. A plan of the site is then put on paper and the operation planned from this. In combination with this the Sutton localizer is used. The twenty odd cases reported in full indicate the general accuracy of this method, its applicability and limitations. The localizing charts take—according to the author—half to three-quarters of an hour to make, and this point alone shows that it is not a suitable method for a large hospital in which a large number of cases have to be dealt with in a limited amount of time. Further remarks on the use and reliability of the Bergonié vibrating magnet show the very limited use of this apparatus, and its inapplicability to a large number of cases. The paper is a long one, full of detail, and should be referred to by those interested.

Pirie[7] has suggested a new method for the rapid localization of foreign bodies from a single radiograph. It applies to the ordinary shrapnel and rifle bullets, and depends upon a comparison of the radiographic shadow with the size of a similar object on a scale he has made of the shadows cast at known depths (i.e., distance from a plate),

at a fixed distance of anticathode to plate ; this is the key radiograph. It cannot be a minutely accurate method, but, during a great rush of cases, is one which, in skilful hands, should be of assistance as a time-saver. It can only be applied to bullets of standard size and shape.

Oram[8] describes in detail his use, and modifications, of the triangulation method of Hampson. His description is written in a manner which is very easy to follow and understand. The chief points are : (1) A new piece of apparatus for centering a tube ; (2) A foot device for making the 10-cm. tube shift : (3) An inverted tape-measure fixed to an overhead arm for measuring the distance of anticathode to screen ; (4) A prepared chart for reading off the foreign-body depth.

Desplas and Chevalier[9] are strong advocates of the compass of Hirtz, and have successfully removed 132 foreign bodies in 132 cases localized with its help. In 40 per cent of these cases previous attempts at removal had failed. These authors claim mathematical accuracy for this instrument. The paper includes a list of the cases operated upon, the projectiles occurring in all parts of the body.

Gamlen[10] has devised a simple little instrument for screen work which should be useful owing to the rapidity with which localization can be done with its help. The instrument consists of a small round screen with curved wires fixed under it, and a handle on which is a scale of depth. A movable shot in the end of an aluminium rod is used for recording the movement of the shadow of the foreign body when the tube is displaced. The crossed wires press on the skin of the patient, and leave marks which can be made permanent by nitrate of silver. The opposite end of the handle has a small hole in it which can be used above and below the part under examination for the purposes of marking the skin on each side of the foreign body. The drawback to the instrument is that it necessitates a fixed distance from anticathode to screen. *(See Plate I.)*

Mercier[11] uses an upright strip of wood into which, at intervals of 2 cm., are inserted a row of steel needles, for estimating the depths of foreign bodies in the tissues. This comb-like structure is placed upright beside the part under examination, with the teeth towards the foreign body, and so arranged that the teeth appear on the screen as one shadow, i.e., all of them are in the path of the normal *x* ray—as is the projectile itself—and the position of the latter is marked on the skin. On displacement of the tube in the usual way, a series of shadows of the teeth appears on the screen with, of course, unequal spaces between them. The shadow of the foreign body is displaced also, and with its distance from the original point will compare with one of the teeth of the comb. A simple calculation then gives the height of the foreign body above the table, and its depth under the skin spot is arrived at by subtraction. It is claimed that this method can be used equally well in the lying-down or standing position, and that it gives results as clear and accurate as any of the ordinary methods ; also that it has the advantages of simplicity and rapidity, without elaborate apparatus and calculations.

PLATE I

GAMLEN'S SCREEN LOCALIZER

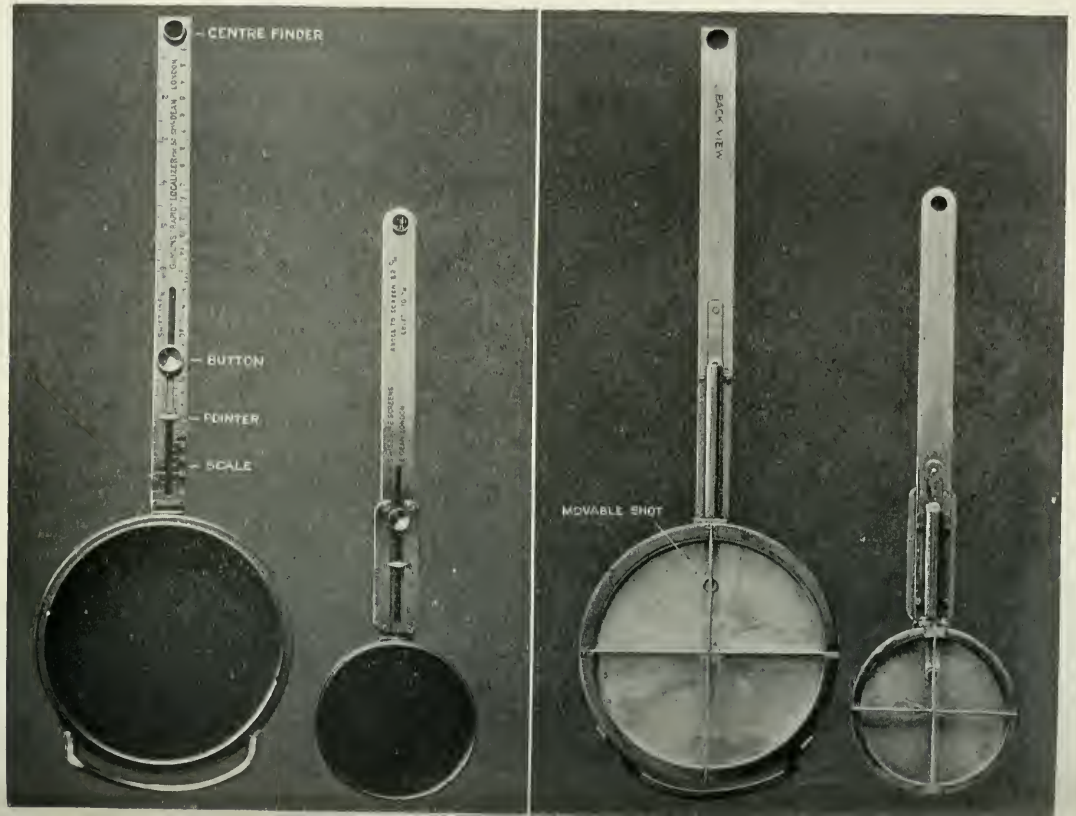
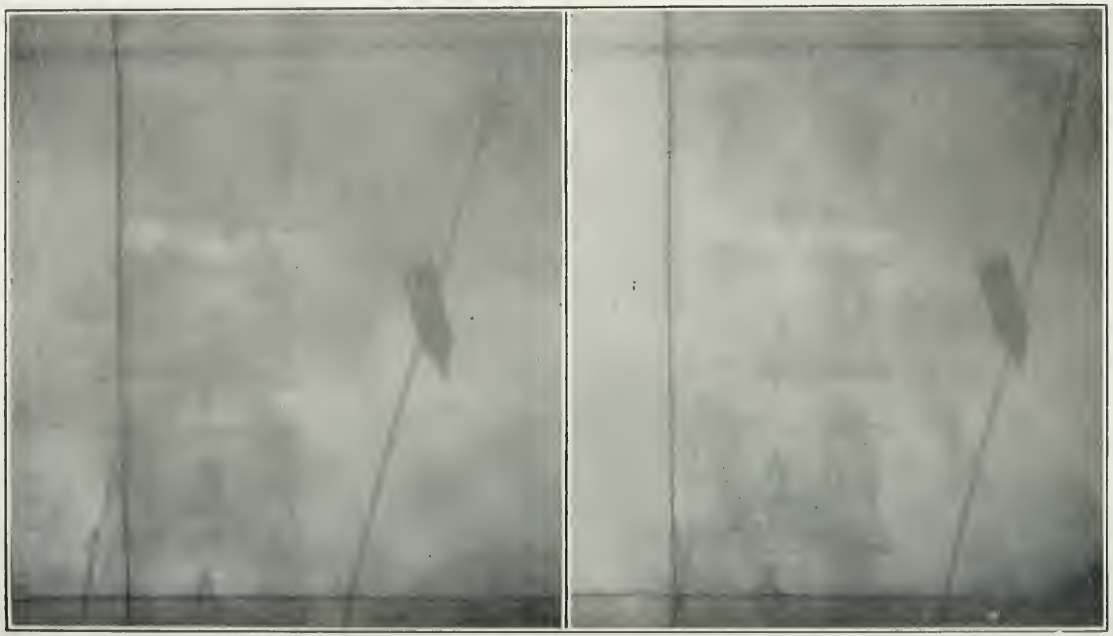


PLATE II.

OPAQUE URETERAL CATHETERIZATION



Stereoscopic skiagram, showing the position of the missile behind the ureteral catheter.

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Wilkins[12] advocates a double exposure on a plate for estimating the movement of the shadow on displacement of the tube, in preference to a screen observation. Additionally he places between the plate and the skin a board on which are stretched two wires at right angles to one another; these wires are inked, and so leave marks on the skin corresponding to shadows on the plate from which measurements can be made for the guidance of the surgeon. Using the triangulation method, he reconstructs on paper the path of the rays, etc., and then works out the depth and position in relation to the wire markings. Some interesting radiographs of foreign bodies in the brain, face, chest, etc., illustrate this paper.

Fullerton[13] points out that it is highly important with bullets to be able to say whether they are in, or outside, a kidney, when the shadow appears in this area. In such a case he has used the opaque ureteral catheter in combination with stereoscopic radiography, and found that the catheter was in front of the bullet in its whole length. (*Plate II.*) By careful measurement the base of the bullet was found to be 1·8 cm. and the point 3·6 cm. behind the catheter, and it was diagnosed as being behind the kidney and ureter at the level of the lower pole. It was found in a small abscess cavity at the point indicated. This case is given in full, with radiographs, and other cases are referred to.

Hernaman-Johnson[14] has applied the principles of foreign-body localization to the elucidation of doubtful shadows in the kidney region, when the measurement of the depth of a shadow may demonstrate the impossibility of it being due to a stone. This paper is illustrated by a case in which a doubtful shadow in the renal area was found to be outside the kidney. A ureteral catheter was passed into the kidney pelvis, the tube focussed, and a double exposure made with the usual tube displacement. On the relative depths of the catheter, edges of vertebræ, and the shadow being worked out, it was found that the former was 1½ in. deeper from the abdominal skin than the opaque mass, and this was considered to prove that the latter was not in the kidney.

The marking of the position of foreign bodies upon the skin has always presented some features of difficulty. Finzi[15] points out that a satisfactory marking material should show up against iodine, should not be easily removable in preparing the patient, should not cause inflammation of the skin, should last, should be in liquid form, and show a mark immediately it is applied. After numerous experiments he arrived at the following formula :—

℞	Acidi Pyrogallici	1 grm.	Liq. Ferri Perchlor. fort. 2 c.c.
	Acetoni	10 c.c.	Spt. Vini Menth. ad 20 c.c.

This gives a concentration of 5 per cent pyrogallol and 2 per cent iron. The mark is brownish-grey at first, but in a few hours turns a brilliant black; it is unaffected by iodine; it can be scrubbed with ether soap and a nail-brush, and still not be completely removed.

There is an interesting paper on the 'Telephone as used for the

Localization and Removal of Metallic Foreign Bodies in the Tissues,' by Bulkley,[16] in which a full account is given of the construction of the instrument and the theory on which it works. The author uses it in conjunction with a series of special needles, scissors, and extracting instruments, all figured and described. Having found that the ordinary carbon electrode in contact with the skin was not satisfactory, owing to the high skin resistance, this flat electrode was changed to one in the shape of a hard carbon pencil $2\frac{1}{2}$ in. in length, which is introduced into the rectum or mouth, the moist mucous membranes having a relatively low resistance. The technique is fully explained, and it is claimed that the average operation time is only ten minutes, and it has never been necessary to make an incision over 1 in. in length.

Grandgérard[17] records a unique case of the "Wanderings of a Shrapnel Bullet in the Circulation." A soldier was radiographed, and what appeared to be a shrapnel bullet was found inside the heart in the region of the right auricle: the body showed rapid and regular movements having the character of an elliptical vortex. One hour later he was re-examined, and there was no sign of the missile anywhere in the thorax, but the same shadow was found in Scarpa's space; a few minutes later the shadow was in the pelvis at the level of the right sacro-iliac joint. A few days later an operation was performed, and the bullet found in the hypogastric vein below the ala of the sacrum. It could not be removed, and the vein was tied below the projectile to prevent any further displacement. It is pointed out that the possibility of such an occurrence must not be overlooked by a surgeon who is attempting to extract a projectile from the heart, and that to avoid such a disaster an operation of this kind must be done under radioscopic control.

In December, 1915 (MEDICAL ANNUAL, 1917, p. 32) Morison published the first radiographs of *Gas Gangrene*, and divided cases of gas in the tissues into two groups. Further papers have since appeared, and Agnes Savill,[18] writing on the *x*-ray appearances in gas gangrene, draws attention to important points. One of these is that the different appearances shown on good plates are diagnostic of the nature of the infection; the other, that a prognosis can be made from these *x*-ray appearances. She recognizes three conditions: (1) Simple swelling, with a pale misty outline; this is probably due to œdema; it is associated as a rule with *B. perfringens*. (2) Swelling and a cloudlike outline, as if the flesh were replaced with dark woolly clouds; this is due to infiltration of the tissues with gas; it is associated with *B. perfringens* and *sporogenes* together. (3) Striation of two kinds, coarse and fine; it is associated with *Vibrion septique*, *B. histolyticus*, and *B. fallax*. The prognosis in condition (3) is very bad, and if a radiograph shows this, immediate active interference is urgent.

Martin Berry's[19] paper is illustrated by some radiographs, most of which show gas bubbles or local collections of gas. He points out certain fallacies which have to be guarded against in making the *x*-ray diagnosis. The three chief ones are: (1) Loss of tissue; (2) Trapped

bubbles of air ; (3) Oxygen bubbles if the wound has been syringed with peroxide of hydrogen. Morgan and Vilvandré[20] also deal with this subject, and point out that a much earlier diagnosis of the presence of gas in the tissues can be made by radiography than by any other method ; and further, that very definite information is given as to the extent of the tissues involved, which is of special importance when the question of amputation arises. Black[21] emphasizes the length of time which may elapse between the date of the injury and the detection of this gas. In one of his cases this was almost five weeks. The most comprehensive paper on this subject hitherto published is by Frances Ivens[22] in relating her experiences with 1694 wounded, of which number 464 showed signs of anaerobic wound infection, and 107 suffered from gas gangrene. She enters very thoroughly into all the questions of radiography, pathology, bacteriology, and surgery, and many radiographs illustrate the various points. The author agrees that in some cases radiography affords evidence of infection before other signs are clear, and quotes a case of deep-seated gas tracery following what appeared to be a superficial wound of the calf of the leg, which was confirmed by an immediate operation.

Vilvandré's[23] paper on radiography in gunshot wounds of the thigh, in addition to being illustrated by numerous excellent radiographs, points out admirably the help that the expert radiographer can give to both the patient and the surgeon. He discusses, amongst other things, the prognosis in cases where fracture has taken place, and in cases where the foreign body has penetrated the bone and caused splitting only ; he considers that very often the latter class of case goes hopelessly wrong on account of the difficulty of efficient drainage and the ease with which sepsis can spread inside the bone itself.

Eccles[24] shows that one result of the War has been the increased use of *x* rays in the demonstration of jaw injuries. He describes very accurately the technique which he finds suitable, and illustrates by photographs and radiographs the best positions to use for the demonstration of the various parts of a jaw, and the manner of obtaining stereoscopic radiographs.

It has been recognized that a crack across the base of the fifth metatarsal occurs in soldiers during route-marching, but Pirie[25] has found that fractures of the second, third, and fourth metatarsals can also be brought about by the same cause. The soldier is not conscious of any fracture, and usually does not give in until some weeks after the injury, when the painful condition leads to an *x*-ray examination. This paper is illustrated by radiographs of six such cases met with in a series of 13,000 *x*-ray examinations.

A long paper by Jacinsky[26] deals with the surgical value of the *x* ray as learnt in Serbia. A portable apparatus working from the alternating or direct current was found to be the best, and, judging from a description of the results obtained, most efficient. Often a special chloride paper or Eastman's films were used instead of glass plates.

Probing for bullets was not practised at all, dependence being placed upon the *x* ray alone, and operations for removal were done under direct *x*-ray observation. The author gives a racy description of the manner in which the *x*-ray work was carried out, and its value in an enormous number of cases. As a record of what can be done even in such an out-of-the-world region as Serbia, and under war conditions, it is a valuable contribution to the use of radiology. (*See also* SKULL, GUNSHOT WOUNDS OF.)

REFERENCES.—[1]*Amer. Jour. Rönt.* 1917, 355; [2]*Ibid.* 350; [3]*Presse Méd.* 1914, Dec. 24; [4]*Arch. Rad. and Elect.* 1914, Dec., 272; *Ibid.* 1915, Feb., 307; *Proc. Roy. Soc. Med.* (*Elect.-Ther. Sect.*), 1915, 23; [5]*Soc. de Chir.* 1914, Mar., 373; *Jour. de Rad. et d'Elect.* 1915, 585; [6]*Trans. Amer. Surg. Assoc.* 1916, 26; [7]*Arch. Rad. and Elect.* 1916, Oct., 137; [8]*Ibid.* 1917, Feb., 277; [9]*Jour. de Rad. et d'Elect.* 1916, 409; *Lyon Chir. Jour.* 1916, 565; [10]*Arch. Rad. and Elect.* 1916, Nov., 175; [11]*Arch. d'Elect. Méd.* 1916, May; *Brit. Med. Jour. epit.* 1916, ii, 15; [12]*Amer. Jour. Rönt.* 1917, July, 343; [13]*Jour. R.A.M.C.* 1917, July, 51; [14]*Arch. Rad. and Elect.* 1917, Feb., 291; [15]*Ibid.* 1917, July, 38; [16]*Surg. Gyn. and Obst.* 1917, i, 366; [17]*Paris Méd.* 1917, Jan.; *Brit. Med. Jour. epit.* 1917, i, 7; [18]*Arch. Rad. and Elect.* 1916, Dec., 201; [19]*Ibid.* 213; [20]*Brit. Med. Jour.* 1917, i, 8; [21]*Ibid.* 9; [22]*Proc. Roy. Soc. Med.* (*Surg. Sect.*), 1916, Dec., 29; [23]*Arch. Rad. and Elect.* 1916, Oct., 140; [24]*Ibid.* 1917, Mar., 313; [25]*Lancet*, 1917, ii, 47; [26]*N.Y. Med. Jour.* 1917, i, 115.

NEW APPARATUS.

The Dubilier[1] *x*-ray outfit is novel. It derives its current from any electric-light main, being attached by the usual plug-adapter to any convenient lamp socket. It can, by a simple device, be used on any voltage from 55 to 250, on alternating or continuous current circuits. It is adaptable for *x*-ray work and high frequency, as well as the cautery. It measures 16 × 9 × 7 in., and weighs only 28 lb. A larger apparatus is made, measuring 24 × 10 × 7½ in., and weighing 43 lb. Both are easily portable.

REFERENCE.—[1]*Arch. Rad. and Elect.* 1916, Oct., 165.

STAINS ON SCREENS.

Mitchell[1] describes a method of removing stains from accelerating screens which should be of value. Lay the screen face up on white blotting-paper, and wash the surface with a swab of cotton-wool soaked in the ordinary solution of peroxide of hydrogen. This washing has to be kept up for about half an hour, when spots will gradually begin to fade away. Cover more persistent spots with a little pool of the peroxide, and allow to stand. Dry with cotton-wool, and then between pads of blotting-paper. Even developer stains can be removed in this way, and the screen is restored without its efficiency being impaired.

REFERENCE.—[1]*Arch. Rad. and Elect.* 1917, June, 27.

X RAYS IN INDUSTRY.

It may not be without interest to call attention to some uses of *x* rays apart from those in medicine and surgery. Under the title of "The *X* Rays in Industry"[1] an account of some of these is given.

During the War it has been attempted to smuggle rubber across the Atlantic by placing it in bales of waste. A shadow was discovered in certain bales examined by *x* rays, the bales were opened, and the rubber found. In a further case the examination of the personal baggage of a traveller revealed mine cases and asphyxiating bombs. By means of a Coolidge tube designed especially to carry high voltage, flaws in metal casings have been demonstrated. Foreign substances in built-up sheets of mica used for insulation in electric motors and generators can be detected. As a commercial application the tobacco beetle larvæ in finished cigars are destroyed, after the cigars are boxed, by *x*-ray treatment, and this without affecting the tobacco.

Reference.—[1]*Amer. Jour. Röntg.* 1916, Oct. 487.

X-RAY DIAGNOSIS.

Œsophagus.—A very rare case of **Fibromyoma** of this organ is fully reported, with drawings and radiographs, by Hall.[1] The case is interesting from the radiographic standpoint, inasmuch as the results are shown in three different stages of the condition, which on the last occasion appeared to suggest a dilatation with hypertrophy. The first examination pointed to growth in the posterior mediastinum: the second, over a year later, to a stricture of the upper part of the œsophagus, with dilatation 'below' the stricture.

Shaw and Woo[2] point out that the use of *x* rays plus the œsophagoscope has rendered it possible to demonstrate the condition of '**Œsophagectasia**' before death. Six of these remarkable cases are given in full detail, and the radiographic appearances described. It is of interest to study the pathological reports of the three fatal cases with the *x*-ray findings.

Finzi[3] describes the *x*-ray appearances in '**Pharyngeal Pouches.**' For their demonstration he uses a thick paste of bismuth oxychloride and water of such consistency that, when heaped up, it has practically no tendency to flow back to its level. The screen examination is all-important, inasmuch as these pouches may be difficult to differentiate from a stricture unless the opaque food can be seen leaving the pouch. The cardinal difference between a pouch and any form of stricture is that the former empties from its upper, and the latter from its lower, end. These cases are supposed to be rare, but the author has seen eight in his private practice during four and a half years.

Stomach.—That the greatest care should be used in the preparation of the opaque meal for the examination of the stomach is evidenced by the result of an inquest[4] at Hull upon a man who died after taking 2 oz. of supposed barium sulphate in bread and milk prior to examination. The drug was supplied to the patient by a chemist, and through a remarkable accident tartar emetic was given instead. The bottle from which it was supplied was labelled 'Barytæ Sulphas,' and it appeared that the label had been incorrectly applied by someone at least thirty years previously. [We would point out that under no circumstances should either bismuth or barium salts—especially the

latter—be used for these purposes on a prescription to a chemist, unless it is stated on the prescription that the drugs are guaranteed as pure and specially prepared for *x*-ray examinations.—C. T. H.]

Knox,[5] in a paper entitled "The After-Technique of the Opaque Meal," describes his attempts to record the findings in a manner suitable for reports, case sheets, and records, which can easily be referred to. He employs a 'pantograph' to reduce accurately and to scale on a prepared card diagram the screen tracings or the plate images. Similar pictures are made of all the plates of a given case, and all the data filled in on the diagram. The complete set of diagrams is then set up and photographed upon a whole plate. From this plate prints of the series on one piece of paper are made, and these prints can be easily filed for reference or attached to case sheets. A further advantage is that it lends itself to the preparation of cases for publication. (*Plates III, IV.*)

Hirsch and Ingber[6] discuss the *x*-ray diagnosis of **Gastric Carcinoma,** and conclude that the most important sign is a defect in the form and outline of the stomach. The following symptom-complex sums up the diagnosis of early pyloric carcinoma: (1) Small, persistent defect in the pars pyloriea; (2) Residue in the pylorie end of the stomach; (3) No dilatation or atony; (4) Achylia. They are of opinion that in all individuals over forty years of age with gastric symptoms an *x*-ray examination is essential if the interests of the patient are to be safeguarded. A paper repaying study is by Cole,[7] entitled 'Indications for Surgical Intervention in Gastric Cancer,' and illustrates the various types of malignant disease and the *x*-ray appearances. Röntgen indications for surgical procedure in such cases are: (1) If the growth is annular and limited to a small area at the pyloric end, exploration with a view to a pyloroctomy is warranted; (2) With extensive growth causing stenosis, if there is sufficient room left, exploration with a view to a gastro-enterostomy is indicated. The author concludes that, in one-half of the cases he has examined the disease has already progressed to such a stage that any operation is contra-indicated; that of the remaining half, only 75 per cent suggest palliative surgical measures: that in only 12 per cent of the total number of cases is radical cure to be thought of, whilst most of these will die in hospital after the operation.

All radiologists should read a paper by MacCarty,[8] a pathologist, on stomach diagnosis. Its purpose is to point out the pathological reasons for legitimate errors in the *x*-ray diagnosis of gastric carcinoma and **Ulcer.** It is illustrated by photographs of specimens and by reproduction of microphotographs, etc. The author concludes that there are no macroscopic differentiating structural differences between a simple chronic gastric ulcer and an early carcinomatous one. There is no differentiating variation in muscular structure which might be the basis of diagnostic difference in gastric rhythm. The diagnosis of early carcinoma in the border of a chronic gastric ulcer is merely a question of the position of a few undifferentiated epithelial cells. For

PLATE III.

THE AFTER-TECHNIQUE OF THE OPAQUE MEAL

(Hour-glass Contracture of Stomach—Penetrating Ulcer on Lesser Curvature—Pyloric Stenosis.)

A.—½ hour after opaque meal.

B.—1 hour after meal.

C.—2 hours after meal.

Captain R. Knox

PLATE IV.

THE AFTER-TECHNIQUE OF THE OPAQUE MEAL—*continued*

D.—4 hours after meal.

E.—7 hours after meal.

F.—24 hours after meal.

these reasons the *x*-ray appearances and signs should not necessarily show any distinguishing features in the two conditions.

White[9] endeavours to point out "Some Limitations in Röntgen-ray Evidence of Gastro-intestinal Lesions." Writing as a physician, who evidently has great sympathy with *x*-ray work, his criticisms are interesting and to the point, and should be read by radiologists. The main thesis is to warn against over-enthusiasm and sweeping statements, and he criticizes various published statistics, and compares *x*-ray findings with after-results. In cancer of the stomach the difficulty is to distinguish between an old simple chronic ulcer and one which has become malignant; whilst inoperable stomach cancer is as a rule easily found, in the early cases—the only kind of real importance—the *x* ray, like every other present clinical method, usually proves a failure. It is also practically impossible to make an *x*-ray diagnosis between cancer and syphilis of the stomach. Many other conditions, such as duodenal ulcer, gall-stones, intestinal stasis, etc., come under critical review, and in conclusion the author emphasizes the fact that, whilst *x*-ray examination of the gastro-intestinal organs is one of the most valuable clinical methods, like every other method it is beset on every side by limitations, and these must be fully recognized if the best use is to be got out of *x* rays.

Le Wald[10] publishes a further account of **Syphilis of the Stomach,** based on a study of nineteen cases. He concludes that the relative frequency and importance of this condition is not yet thoroughly appreciated, and that a combination of *x*-ray examination and the Wassermann reaction provides data necessary to establish the diagnosis in doubtful cases. The *x*-ray findings he summarizes under four heads: (1) Diminished size of stomach; (2) Dumb-bell-shaped deformity—a wide area of the middle of the organ being stenosed, in contradistinction to the hour-glass from ulcer, in which the area is circumscribed; (3) When the pyloric region only is involved, the findings resemble those of cancer in the same region; (4) Filling defects similar to those found in new growths. Some striking radiographs illustrate these conditions.

Mills,[11] in a thoughtful and suggestive paper, based on graphic records of over 1000 subjects, with notes and orthodiagraphic studies of as many more, discusses the question of the "Relationship of Bodily Habitus to Visceral Form, Position, Tonus, and Motility." The question of what is normal as regards the shape, size, and position of the so-called normal *x*-ray stomach is discussed in all its bearings, especially from the view point of what really constitutes pathological gastroptosis or visceroptosis. It is shown how widely normal stomachs may vary, and how intimately these variations are connected with variations of physique and general body structure; and that there is a constancy of relation between certain physiques and certain types of visceral form and arrangement when dealing with extremes. Two definite types are advanced: (1) The hypersthenic, when the stomach is almost thoracic—the bull-horn type—occurring in subjects of

massive and powerful physique; (2) The asthenic—predisposed to visceroptosis; the stomach of the type seen in what is usually described as gastroptosis, in which the subject is of frail and slender physique, with a wide and capacious pelvis. Variation in the degree of visceral tonus is the most striking difference between these two types, the essential attributes of the first being hypertonicity, and of the second atony, whilst infinite variations of visceral topography, form, tonus, and motility occur in variations of bodily physique. Diagrams and photographs serve to emphasize the various points.

Case's paper on the duodenum—referred to in the MEDICAL ANNUAL for 1917—has been reprinted in a British journal.[12] We call attention to this on account of the very great value to radiologists, to surgeons, and to physicians, of this comprehensive, well-written, and well-illustrated communication.

Appendix.—Pettit[13] considers **Chronic Appendicitis** can be diagnosed by radiography. By careful methods the barium-filled appendix can be seen in eight of every ten cases, and it is possible to determine exactly its shape, size, and position, the presence or absence of kinks and constrictions, and whether it is freely movable or adherent to other viscera. Typical cases are quoted in full, with the *x*-ray and operative findings; but when the author asserts that *all* operations on cases supposed to be chronic appendicitis should be preceded by a thorough Röntgen examination, and that practically every true case of chronic appendicitis can be determined by this examination before operation, he seems to be making somewhat extravagant claims for radiography.

Gastrocolic Fistulæ.—Burnham[14] has diagnosed with *x* rays two cases of **Gastrocolic Fistulæ** during life, in both of which no clinical diagnosis had been made. After reviewing the *x*-ray literature of such cases—which is small—the two he met with are described. In one, post mortem, a growth of the splenic flexure perforated and led into a large cavity which communicated with the stomach by five fistulous openings. Barium food was seen, during life, to return from the colon to the stomach. In the other case, as a result of annular growth of the hepatic flexure, during life the food was seen to flow from the duodenum into the colon and also in the reverse direction. The opening was confirmed by operation.

Pelvic Colon and Rectum.—Case[15] has a long, profusely illustrated paper on the pelvic colon and rectum, röntgenologically considered. The effects of abnormal conditions in the pelvic colon and rectum, with their results on other parts of the large bowel, are considered from the *x*-ray point of view. It is shown that damming back of food in the cæcum, ascending colon, and appendix, associated with constipation, is frequently the result, not of chronic appendicitis, but of adhesions in and about the pelvic colon, and resulting antiperistalsis. This explains why removal of the appendix in such cases so frequently fails to cure. The portion dealing with the rectum is interesting, and the radiographs, following a barium enema, of this part of the bowel in

various abnormal conditions, are instructive. The effects on the barium shadow of carcinoma of the rectum, carcinoma of the prostate involving the rectum, syphilis, fissure, and fistula are very beautiful and technically perfect. Particularly striking is a radiograph of multiple diverticula of the pelvic colon contained in a large scrotal hernia. Apart from the *x*-ray appearances, the description of the pathology of constipation due to large-bowel causes, and the effects produced as a result on the barium meal and enema, are valuable.

Gall-bladder.—George and Leonard,[16] in a paper illustrated by a large number of very fine radiographs, discuss the possibility of making a diagnosis of the pathological gall-bladder by means of *x* rays. They claim that it is not possible to visualize the normal gall-bladder, and that when this organ is shown it means that it is the seat of some pathological changes. It is pointed out that the gall-bladder may be found anywhere in the right side below the diaphragm, and that the shape of its shadow is roughly that of a pear, the most constant feature being the characteristic curve of the lower pole. In many cases definite evidence of the gall-bladder can be obtained by radiographs taken after a barium meal.

Fœtus.—Case[17] has successfully diagnosed anencephaly before birth by radiography, the only means by which such a diagnosis could possibly be made. The rounded shape of the head was conspicuously absent on a plate which showed distinctly the spinal bones and those of the base of the skull and of the face. Complete details of the case and a description of the fœtus are appended, with a review of the *x*-ray literature on the subject.

Thymus and Thyroid.—J. A. and W. A. Quinby[18] say that it is usually possible to distinguish intrathoracic **Enlargement of the Thyroid** gland from an **Enlarged Thymus** by its high position, but that the shadows of the two structures may fuse and so lead to difficulties of interpretation. To diagnose an enlarged thymus in a child by radiography often necessitates several examinations, owing to the fact that the size of the gland varies so much at different times. If both lobes are enlarged, a dimly-defined shadow extends downwards over the base of the heart, tapering to a rounded point in the mid-line ; when one lobe only is involved, it is usually conspicuous by its long border, which thins out until lost in the base of the heart shadow. In infants an enlarged thymus is best determined during an attack of dyspnœa, when its shadow often occupies as much as half the total area of the thorax on the *x*-ray plate.

Urinary System.—A rare case is recorded by Harris,[19] in which a patient had symptoms of **Vesical Calculus,** and a radiograph showed apparently three calculi. At the operation one calculus was removed, and the two other shadows were found to be due to calcified hydatid cysts. On further examination a floating hydatid cyst was discovered in the abdomen. The radiograph is reproduced.

It is always useful to know of unusual possibilities as regards **Kidney and Ureter Stones,** as knowledge of these makes for more accuracy in

x-ray diagnosis. Lemon[20] records a case in which a group of shadows was found in a male, scattered in the triangular space formed by the crest of the ilium and the lower lumbar vertebræ. The man had severe and repeated attacks of what was taken to be renal colic; repeated *x*-ray examination had been made, with a negative diagnosis of stone. Finally, and as a result of a last *x*-ray examination, it was decided to operate, and a peculiar reddish fleshy mass was found surrounding the ureter at the level of the pelvic brim, and in this mass five calculi were found, all external to the ureter. Analysis showed the stones to consist of acid phosphate of calcium, and the pathologist stated them to be of undoubtedly renal origin. The author suggests that they lay in a second ureter of the right kidney, or that they were in the substance of a rudimentary and functionless kidney. The case is incomplete, as no microscopic examination was made of the tissue in which the stones were embedded.

Rowlands,[21] in the obstruction of the ureter by an abnormal renal vessel, has a good deal to say on the value of *x*-ray diagnosis in **Kidney Cases**, and as these remarks come from a surgeon, and not a radiologist, they are worthy of consideration by those practising *x*-ray work. The two chief points made are: (1) That in suspected cases an *x*-ray examination should always be made, but that a negative report as regards stone in the ureter is not conclusive, for many reasons; (2) Whilst a positive *x*-ray report more rarely misleads, he has had cases in which on account of shadows he has performed blank operations. It is difficult to understand how a stone, 'the size of a filbert,' which was removed from the upper part of a ureter, escaped the *x*-ray observation of five different hospitals.

Bones.—Writing on the differential Röntgen diagnosis in bone diseases, Boggs[22] discusses mainly the *x*-ray appearances in **Tubercle**, **Acute Osteomyelitis, Syphilis,** and **Malignant Disease.** He maintains that in many instances the exact diagnosis cannot be arrived at by radiological appearances alone, but the case must be viewed in all its aspects plus the radiographs; that in the early stages of both tubercle and osteomyelitis *x*-ray signs may be completely absent; and that periosteal sarcoma is often the most difficult type of malignant disease to diagnose certainly from the *x*-ray appearances. Especially dangerous is it to rely upon negative radiographic findings in the early stage of acute osteomyelitis, and active treatment in such a case should never be deferred because such an examination is entirely negative. This paper is full of suggestion, and we commend it to all radiologists.

Salmond[23] illustrates with a beautiful series of radiographs the bone appearances and the progress from the *x*-ray point of view of two cases of **Osteomyelitis**; one from staphylococcic infection and the other from syphilis. Thirteen radiographs of the former case are very instructive: the first, taken at the onset of the disease, shows practically nothing abnormal; others taken at intervals up to forty-nine months show the disease reaching its height and resulting in the

practical destruction, and the regeneration, of the whole shaft of the radius. The chequered career of this bone goes on until fifty-four months from the onset. In no other way than by *x* rays could such a pathological record of a living case be obtained. The second case, not so striking radiographically, nevertheless shows the course of the disease as affecting a radius and the practical cure under treatment. [This method of demonstrating the course of bone diseases has been too little followed, and further research in this direction is indicated.—C. T. H.]

Martin Berry[24] draws attention to the part which trauma plays in the etiology of **Arthritis.** This is a good attempt to differentiate a quite definite and important type of case from the conglomerate mass of so-called chronic arthritis. In some thirty-nine cases the sufferer volunteered the statement that the symptoms had followed directly upon an injury, and the authors holds that this fact should be recognized, viz., that this condition is one which may be immediately caused by an injury. The actual symptoms may not come on immediately after receiving the injury, as the disease obviously takes some definite period of time to develop to the stage when pain, etc., become evident. The most impressive case of the series is No. 32, showing a hip-joint two years after a kick, and in this case it is noticeable that it was three months after the injury before a limp developed. [This fact, not generally recognized, that trauma may be the direct exciting cause of this condition, has a definite and important bearing on the question of the Workmen's Compensation Act. A man may resume work after what appears to be a minor injury, and, only later on, gradually become incapacitated. It may then be difficult to convince his employers (or the Insurance society's officials and advisers) that the injury had anything to do with the subsequent arthritis. —C. T. H.]

Hickey[25] advocates a more extensive use of the lateral position in the *x*-ray examination of the spine. His paper is convincingly illustrated by radiographs in which lesions shown in the lateral position are not demonstrated in the more usual antero-posterior views. He considers that the lateral examination should be a routine in addition to the antero-posterior. Powerful apparatus, sometimes plus the use of screens, has given sufficient penetration for these views of the spine, whilst the distortion can be obviated by increasing the distance between the tube and patient. The writer considers a tubular type of diaphragm to be essential.

Skull and Brain.—George[26] suggests an improvement on Finzi's technique for the accurate **Delineation of the Pituitary Fossa** which is of great value and of very easy application. Two applicators are made (*Figs.* 1, 2). These are adjusted, and fixed with strapping, in the auricles, in exactly the same positions. The head, with the tube below and centered, is then adjusted on its side until the shadows on the screen appear as in *Fig.* 3. Then move the tube 3 cm. forwards and $2\frac{1}{2}$ cm. upwards—as regards the head—and the pituitary fossa is

accurately shown. [We have tried this technique with great success, and found it easy.—C. T. H.]

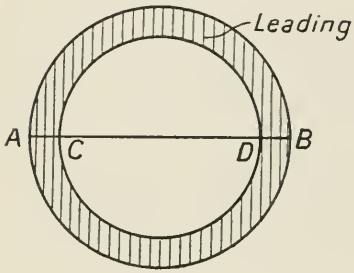

Fig. 1.
A B = 20 mm.
C D = 14 mm.

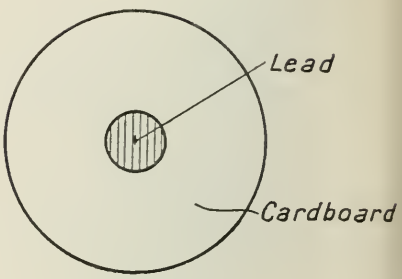

Fig. 2.
Lead disc 0·7 mm in diameter.

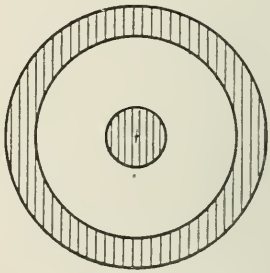

Fig. 3.
Position of shadows when exact first position is obtained.

Figs. 1–3.—*X*-ray delineation of the pituitary fossa.

Pfahler[27] describes a 'head leveller' he has designed, which, in addition to focussing correctly for the pituitary fossa, can be used for placing the head in correct position for the radiography of any of the sinuses. This leveller has the advantage that no preliminary screening is necessitated. The instrument consists of two parallel bars of aluminium 20 cm. long, 2 cm. wide, and 2·5 mm. thick, connected by telescopic tubes sliding inside one another and adjusted by a thumb-screw. A groove and pin prevent any rotation. Spirit levels are attached to the upper bar and to the connecting tube. The parallel bars are rounded at the ends to fit accurately against the concha. Reference should be made to the paper for illustrations demonstrating the construction and application of this instrument.

Scott[28] reports a rare case of air and fluid in the left cranium in a female who complained of severe headaches and a feeling of splashing in the brain. A very remarkable radiograph taken in the upright position shows a horizontal line of fluid in the frontal region, with air in the space above; also the shadow of a dense bony tumour in the left

PLATE V.

AIR AND FLUID IN LEFT CRANIUM

orbital region (*Plate V*). On the screen, shaking the head produced the same *x*-ray appearances as seen in a pyopneumothorax. The condition appeared to have come on gradually after an operation nine years previously for a bone tumour in the orbit, and Scott suggests that at the operation a hole was made in the roof of the orbit through which air had been admitted in small quantities. Compression by the air had displaced the left brain, and cerebrospinal fluid below the air accounted for the *x*-ray appearances.

Iglauer[29] advocates the use of the oblique method of radiography for showing the ethmoid and sphenoid cells. In this method the patient lies on his side on the table with his face against the plate. The head is so tilted that the plate is in contact with three points—the malar eminence, the outer edge of the supra-orbital margin, and the tip of the nose, the central ray going through the upper edge of the auricle on the other side. The paper gives diagrams of the exact position and radiographs of the normal and pathological cells. Each side must be examined for comparison. The author considers this to be the best and most accurate method for observing this region, and claims that the examination is a great aid to diagnosis.

Heuer and Dandy[30] publish a comprehensive article on 100 consecutive cases of **Brain Tumour** and the *x*-ray findings, illustrated by a series of radiographs in which direct and retouched prints accentuating the abnormalities shown are placed side by side. This, from the *x*-ray point of view, is a most valuable paper, and as the operative and post-mortem findings are compared with the *x*-ray findings and indications, the exact relationships of the latter to the diagnosis are clearly indicated. The chief points demonstrated are: (1) Radiographs of the head are an important aid in the diagnosis of brain tumour; (2) Uncalcified tumours do not as a rule cast shadows; (3) Calcified tumours are readily recognized; (4) Local changes in the skull, separation of cranial sutures, convolutional atrophy, alteration in the outlines of the sella turcica, and vascular changes are very important. Stereoscopic radiographs are essential, in addition to comparison of the two sides of the head. Not the least interesting part of this paper is the demonstration of calcification in normal parts of the intracranial structures, and radiographs are shown of calcified pineal gland, calcification in the choroid plexus, and calcification in the falx cerebri, any of which, without the knowledge of these possibilities, might easily lead to extravagant *x*-ray diagnosis. The authors state that in 45 per cent of the patients in this series röntgenography has been of real diagnostic value. The paper is of great importance, and should be studied by every radiologist.

References.—[1]*Quart. Jour. Med.* 1916, July; [2]*Lancet*, 1916, ii, 934; [3]*Proc. Roy. Soc. Med.* (*Elect.-Ther. Sect.*), 1916, Dec., 63; [4]*Brit. Med. Jour.* 1917, ii, 169; [5]*Arch. Rad. and Elect.* 1917, April, 349; [6]*Amer. Jour. Röntg.* 1917, June, 261; [7]*Ibid.* Feb., 81; [8]*Ibid.* 67; [9]*Boston Med. and Surg. Jour.* 1917, Jan., 92; [10]*Amer. Jour. Röntg.* 1917, Feb., 76; [11]*Ibid.* April, 155; [12]*Arch. Rad. and Elect.* 1917, June, July, Aug. 16, etc.; [13]*Ibid.* April, 1917, 245; [14]*Amer. Jour. Röntg.* 1917, April, 173; [15]*Ibid.* 1917, Aug., 373; [16]*Ibid.* 1917, July, 321;

[17]*Surg. Gyn. and Obst.* 1917, Mar., 312 ; [18]*Med. Rec.* 1917, i, 13 ; [19]*Arch. Rad. and Elect.* 1917, April, 363 ; [20]*Ibid.* 1916, Sept., 107 ; [21]*Brit. Med. Jour.* 1917, i, 755 ; [22]*N. Y. Med. Jour.* 1917, ii, 112 ; [23]*Arch. Rad. and Elect.* 1917, March, 327 ; *Proc. Roy. Soc. Med. (Elect.-Ther. Sect.)*, 1917, March, 77 ; [24]*Ibid.* July, 105 ; [25]*Amer. Jour. Röntg.* 1917, March, 101 ; [26]*Arch. Rad. and Elect.* 1916, Nov., 169 ; [27]*Amer. Jour. Röntg.* 1917, April, 193 ; [28]*Arch. Rad. and Elect.* 1917, Jan., 237 ; [29]*Jour. Amer. Med. Assoc.* 1916, ii, 905 ; [30]*Johns Hop. Hosp. Bull.* 1916, Nov., 311.

X-RAY AND RADIUM THERAPY.

Stevens[1] publishes a preliminary account of his researches on the blood in cases of **Cancer** undergoing *x*-ray treatment. A series of charts showing the blood counts at different stages are a feature of this report. The paper gives a *résumé* of the experimental work done on animals, and refers to the conditions found in *x*-ray workers. Very full details are given of sixteen cases, and these will repay careful study. The work was primarily undertaken to determine the relationship between changes in blood counts of cancer patients being treated by *x* rays and the progress of the case. Shortly, the data to hand seem to justify certain conclusions : (1) That large penetrative doses of *x* rays profoundly affect the erythrocytes of human beings—this is contrary to experimental work on small animals ; (2) That for the first few days of treatment the lymphocytes are suppressed or destroyed, but that between the third and seventh days a reaction with lymphocytosis occurs ; (3) That there is a strong resemblance between the curves of these lymphocytic reactions and those which constitute the opsonic index ; (4) The repetition of dosage should probably be governed by the blood reactions ; (5) *X* rays tend to stimulate a general, though temporary, immunity, if lymphocytosis is an indication of immunity. This communication is a valuable addition to *x*-ray therapy, and should be followed up.

A comprehensive paper by Pfahler[2] on the treatment of **Malignant Disease** by means of deep Röntgen therapy and electrothermic coagulation, discusses the theory of the effect of *x* rays. It is suggested that a growth is less and less affected by each succeeding dose administered : in short, that an increasing resistance to the *x* rays develops, and that therefore at the first treatment the largest possible dose should be given to any tumour from as many angles as is possible. Filtration is of great importance, and now the author uses 6 mm. of aluminium or its equivalent, this permitting the administration to the deeper tissues of ten times the dose that was formerly possible ; combined with the cross-fire method this enables large quantities of *x* rays to be got to the deeper parts of a growth. Electrothermic coagulation —otherwise diathermy—should be combined with deep Röntgen therapy in the treatment of all superficial lesions, such as epitheliomata, degenerating moles, superficial sarcomata, and especially to epitheliomata of the mouth. In concluding, it is laid down that malignant disease should be, as far as is possible, completely removed surgically, or destroyed by electrothermic coagulation, and that either operation should be followed up by *x*-ray treatment. Inoperable cases should

always be given the benefit of the rays, as, in addition to relief, life is prolonged. Four cases of the disappearance of **Metastatic Carcinoma** of bones are given, with illustrations showing the disease, and the cure after treatment.

Bearing upon the same subject, Case[3] discusses the claims which may at the present time be advanced for radiotherapy in cancer. A comparison is made between radium and *x* rays, and it is urged that it is not generally appreciated that the hard *x* rays, now easily obtainable, have almost as great a penetrating power as the harder gamma rays of radium. To this should be added a realization of the fact that *x*-ray tubes are capable of furnishing hundreds of times the amount of radiant energy for deep therapy obtainable from, say, 100 mgrms. of radium element, and then we shall begin to appreciate that there is probably not so very much practical difference between the two agents. Some interesting details are furnished of the results of exposing to radium and *x* rays a gold watch placed on a photographic plate, and the illustrations are instructive. In discussing the causes of failure, the author points out that amongst others is the fact that the treatment is so inadequately carried out, in so many cases, by men and women not prepared by education and experience to do it, whilst very often the one in charge is not even a physician. The conclusions arrived at practically coincide with those of Pfahler: and Case asserts that there is no question now about the possibility of effecting a local cure of cancer in the human body, but that we lose our patients in the end because of inaccessible metastases. (*See* RADIUM THERAPY, p 56.)

In an address on *x* rays and **Malignant Disease,** R. Morton[4] discusses the vexed question of radium and *x* rays, and deprecates very strongly the extravagant claims which have been made on behalf of the former. He advocates in no uncertain manner the post-operative *x*-ray treatment of malignant disease. Taking breast cases, for example, he considers that this treatment should be commenced as early as the second day after operation, and continued with energy for the first few weeks, and that the patient should remain, on and off, under *x*-ray treatment for at least three years. A closer co-operation between surgeon and radiologist is advocated. The important point is to kill any cancerous cells which may have escaped the knife, and a plea is put forward for the application of a large *x*-ray dose to the wound before the surgeon closes it. The paper concludes with a few remarks on the treatment of so-called inoperable cases, some of which can undoubtedly be rendered operable by irradiation. A further reference to this subject is to be found in a letter by Hernaman-Johnson,[5] who puts the case for *radiation* forcibly, and advocates its pre-operative as well as post-operative employment. The ground on which this suggestion is based is that operation is liable to set free malignant cells to be carried away by the blood-stream to any parts of the body; that it is known that cancer cells can be materially affected by *x* rays, and it is known that cancer grafts exposed to *x* rays rarely

take. Pathology has also shown that most of the cancer cells in growths subjected to *x*-ray treatment for a few weeks before operation show degenerative changes.

Twenty-three cases of **Sarcoma** have been treated by *x* rays by Gaarenstroom[6] during the past two years. All these had massive doses from high tubes with a considerable amount of filtration, and each growth was attacked by various skin routes. A series of doses were spread over about a fortnight, after which an interval was allowed, to watch the result; if, after the first series of radiations, no favourable reaction followed, it was of no use trying a second series. Several interesting cases, including sarcoma of the cheek, jaw, naso-pharynx, and tonsil, are given in full. All these cases were inoperable as far as a total extirpation was concerned, but in some, certain surgery was done in addition to *x* rays. In some of the cases eighteen months to two years had elapsed with no sign of recurrence. In reviewing the cases, the result was reached that round-celled sarcomata did best, spindle-celled in only a few cases, and the sarcomas with polymorphic cells showed no favourable result at all. An opinion arrived at was that at present the best criterion for determining the sensibility of sarcomas to radiation is the histological structure of the tumour.

Johnston,[7] on the *x*-ray treatment of 'hopeless malignancy,' remarks on the subject of *immunity*, partial or complete. He considers that in some cases the immunity develops during the progress of the disease, and, further, that it is sometimes increased by radiotherapy. A suggestion is made that eventually the treatment of malignancy will be by means of a chemotactic agent similar in nature to salvarsan. Looking back over the records of a number of cases, the author can recall the patients, each of whom was in such condition that it seemed almost foolish to attempt relief, and yet in spite of this there was complete and permanent recovery in many cases. The paper is a plea for interest to be taken in even the apparently hopeless case.

Fibrous Adhesions.—Williams,[8] in advocating the use of filtered *x* rays for the relief of fibrous bands and adhesions resulting from bullet wounds, describes favourable results in four cases. Experience with keloid and hypertrophic skin scars suggested that the same treatment might be of use in removing fibrous tissue giving rise to trouble in deep wounds. In one case of extensive loss of sensation in the forearm, much weakness, etc., complete cure resulted and sensation returned—the man being discharged as fit for general service. Bearing on this, Hesnard[9] has treated nerve lesions by deep radiotherapy of the nerve cicatrices, and has obtained very satisfactory reparation of the nerve functions. The treatment is especially indicated in recent lesions with extensive loss of the soft parts, but old lesions are also susceptible of amelioration.

Exophthalmic Goitre.—Hernaman-Johnson[10] considers that the action of small doses of *x* rays in the treatment of exophthalmic goitre is a regulating one as regards the secretion of the gland. McKenzie

states that the mortality of this disease in its acute form is 25 per cent, and, whilst approving of *x*-ray treatment, says that it is apt to fail in very bad cases—those so ill as to be confined to bed. This is not the writer's experience : on the contrary, it is just these serious cases which often do the best. He advises very small *daily* doses in such cases for a few weeks, and is altogether against the concentration of small doses into one larger weekly dose. A distinction is drawn between cases of simple over-secretion, and those where over-secretion is combined with secretion vitiated in quality. In considering *x*-ray treatment, in addition to the question of the 25 per cent death-rate of McKenzie, a paper by Judd and Pemberton[11] on the results of operation for this disease should be read. This is a statistical study of 176 patients operated upon in the Mayo clinic in 1909, of whom 121 were traced. The results are given as 45 per cent cured, 18 per cent still showing signs of the disease, 20 cases showing some improvement or none at all. The average time required to effect cure was 17·9 months, whilst of the 176 cases 21 died.

Grier[12] divides cases of **Hyperthyroidism** into four groups, and claims 100 per cent of cures in his first group of the simple hyperthyroidism which occurs at adolescence. In his second group—acute exophthalmic goitre—*x*-ray treatment is the most satisfactory, whilst surgery is unnecessary. In chronic exophthalmic goitre the choice lies between *x* rays and surgery. In the fourth group, when hyperthyroidism develops on old goitre, *x*-ray treatment is only palliative. Speaking generally, the longer the disease has been present and the harder the gland, the greater will be the difficulty in obtaining a satisfactory *x*-ray result.

Tuberculous Conditions.—Eisen[13] has had some successful results in the treatment of tuberculous peritonitis with *x* rays. In 7 of his 11 cases operation had placed the diagnosis beyond doubt ; clinically there was no doubt in the remaining 4. Treatment has to extend over a considerable period. Nearly all these cases steadily gained weight week by week, and were completely cured and were known to have remained well for eighteen months to two years after treatment had ceased. The author considers that these satisfactory results from *x* rays, in usually very hopeless cases, are an important therapeutic advance.

Morton[14] has exposed guinea-pigs to massive doses of *x* rays, with a result that the average number of white blood corpuscles was reduced from the normal of 12,000 to 15,000 per c.c. to from 4000 to 6000, and the count remained depressed for over a week. Inoculating these *x*-rayed animals with tuberculous urine, they developed tuberculous lesions in a much shorter time than the normal—control —animals. The *x*-rayed guinea-pig developed the pathognomonic tuberculous lesion in from eight to ten days after the intraperitoneal injection. It is clear that the practical result is the considerable lessening of the time waiting for the development, and so a more speedy diagnosis.

Lichen Planus.—Da Silva[15] reports a case of lichen planus, in which the disease advanced under various methods of treatment and the itching became intolerable. Following a stimulating dose of *x* rays, marked relief in the itching occurred, and it disappeared altogether in a week. A few more similar doses resulted in complete cure, with restoration of healthy circulation and disappearance of the eruption.

Radium Therapy.

Bubb[16] describes two applicators he devised for the treatment of **Malignant Disease in the Throat and Pharynx,** For an endothelioma of the soft palate, an extension was fixed on to a vulcanite plate corresponding to the area to be treated; the upper part of this was grooved for the accommodation of the radium tubes, each groove being lined with lead on its under surface. In disease of the pharynx a crown was fixed on a tooth; from this crown a wire extended downwards to hold a vulcanite block corresponding to the area of the growth. This block was lined with lead on both sides, but in the pharyngeal side had an opening for the radium applicator. Diagrams show the exact shape of these appliances, which can be modified to suit almost any form of oral growth.

For the treatment of **Cancer in the Prostate and Bladder**, Young[17] has made modifications of, and additions to, a cystoscope, so that radium application can be visually placed exactly upon growths. The cystoscope and applicator are held in position mechanically, and inspection is possible at any time to see that the position remains satisfactory. It is possible to place the radium in direct contact with the growth whilst the rest of the bladder is protected. The methods of intra-urethral and rectal radium applications are dealt with. Large amounts of radium, in high concentration, are desirable, in order to make the treatment, amounting to 200 or more mgrm.-hours, as short as is possible. Good results were obtained.

Burrows[18] describes a trocar for the purpose of introducing radium, and radium emanation tubes, into tumours. The cannula has a slot running its whole length; when it is pushed into the tumour and the sharp trocar withdrawn, the radium tube is placed in the cannula with its silk withdrawal attachment in the slot, the tube is pushed home with a blunt trocar, and then both it and the cannula are easily withdrawn, leaving the radium *in situ* and the silk coming through the hole in the skin.

Those interested in the reports of the Edinburgh Infirmary by Dawson Turner,[19] of the Manchester Radium Institute by Burrows,[20] and the London Radium Institute by Pinch,[21] will find these references of use. Taken as a whole it cannot be said that these reports indicate anything new in either technique, treatment, or results. It appears to be agreed that **Sarcomata,** if treated vigorously, react favourably. Symptomatic improvement is said to follow almost invariably on the radium treatment of inoperable cases of **Carcinoma**

of the Uterus; arrest of hæmorrhage, lessening of discharges, healing of ulceration, reduction of surrounding infiltration, diminution of the rate of growth, and amelioration of pain, being constantly observed. Additionally, some apparently inoperable cases have become operable. In the Edinburgh report we find that of seven cases of **Exophthalmic Goitre,** six benefited; the other case died in less than one month after treatment, of hyperthyroidism. Turner, in reporting on these cases, again emphasizes the results of Rave's experiments on cats and rabbits, in which large doses of *x* rays to the thyroids of these animals produced no recognizable histological results. The inference is that the thyroid gland is a structure which, as far as histological examination is concerned, is refractory to *x* rays, and yet the clinical evidence of the beneficial effect of irradiation in exophthalmic goitre is indisputable. Pinch again emphasizes the improvement in cases of **Arthritis Deformans**; 128 such cases were treated to a conclusion, with a daily administration of 250 c.c. of radium emanation solution of a strength of not less than one millicurie per litre. Those do best under forty years of age, in which the disease is of short duration and infective in origin.

Discussing the place of radium in the treatment of **Cancer,** Abbe[22] points out that whilst surgery has never cured the disease, but only 'removed' it, radium helps it to cure itself by altering the diseased cell growth. The author illustrates an interesting paper by cases showing the manner in which certain tumours cured by radium disappear and practically leave nothing to show that they had existed. References are made to definite, inoperable cancer, in which periods of from two to eight years have elapsed since the radium treatment, without recurrence. He emphasizes the points that radium treatment is still in its infancy, and that results already obtained, notwithstanding the many disappointments, should encourage and stimulate further work and research. Take the case quoted of the woman who had a growth in the neck adherent to the carotid artery, so that complete removal was impossible, and in whom, after the attempted removal, radium was placed against the remains of the growth. This tumour was verified as carcinoma, and yet the patient is alive without recurrence eight years later. The moral appears to be that this one case of undoubted cure is of more real importance than all the cases of failure. Surgery merely removes a group of irresponsible cells; radium—in certain cases—reduces these cells to a condition of responsibility, and normal conditions of life result. The reason of these changes may possibly in the future reveal to us the cause of malignant growth.

Ewing,[23] writing upon radium therapy in cancer, deals with the changes following the application of radium, the microphotographs which are used as illustrations being very good. In discussing the limitations of radium, on the one side are placed the causes of disappointment in results and the causes of failure, and on the other the long list of favourable results reported by a vast number of workers.

Possible developments may lead to the treatment of 'operable' cases by radium, and although far from recommending this at the present time, the writer suggests that the future may have great possibilities in store. The possession of an agent which can bring about the destruction of tumour cells without seriously injuring the contiguous normal tissue is a matter of great biological interest, probably the most important single contribution of modern cancer research.

Mottram and Russ[24] have carried out a series of experimental observations in a case of cancer of the breast, with a view to the study of the dosage in radium therapy. The two facts which were established are: (1) That if the skin be irradiated in such a manner that neighbouring portions absorb the same amount of beta-ray and gamma-ray energy, the reactions are of the same kind, but are generally of a more pronounced degree with gamma rays; (2) That if the skin be exposed to a larger quantity of radiation—beta or gamma rays—for a short time, a much more pronounced reaction is observed than if the same dose be so administered that the quantity is small and the time correspondingly prolonged. It seems probable that the effects are very intimately bound up with the series of changes which form the cycle of the cell's life, viz., growth to maturity, division, and growth once more, the point being that the stage of cell life represented by division is an especially vulnerable one to radiations.

References.—[1]*Amer. Jour. Röntg.* 1917, May, 213; [2]*Surg. Gyn. and Obst.* 1917, i, 14; [3]*Ibid.* 580; [4]*Med. Press and Circ.* 1917, April, 350; [5]*Lancet*, 1917, i, 628; [6]*Arch. Rad. and Elect.*, 1916, Dec., 220; [7]*Amer. Jour. Röntg.* 1917, May, 210; [8]*Brit. Med. Jour.* 1916, ii, 754; [9]*Arch. d'Elect. méd.* 1916, xxiv, 305; *Surg. Gyn. and Obst.* 1917, i, 399; [10]*Pract.* 1917, July, 10; [11]*Med. Press and Circ.* 1916, cii, 125; *Surg. Gyn. and Obst.* 1917, i, 11; [12]*Amer. Jour. Röntg.* 1917, June, 300; [13]*Ibid.* Jan., 602; [14]*Jour. Exper. Med.* 1916, xxiv, 419; *Brit. Med. Jour.* 1916, ii, 881; [15]*Ibid.* 1917, ii, 11; [16]*Arch. Rad. and Elect.* 1917, Feb., 293; [17]*Jour. Amer. Med. Assoc.* 1917, ii, 1174; [18]*Lancet*, 1917, i, 548; [19]*Ibid.* 546; [20]*Ibid.* 547; [21]*Brit. Med. Jour.* 1917, i, 515; [22]*Med. Rec.* 1917, i, 931; [23]*Jour. Amer. Med. Assoc.* 1917, i, 1238; [24]*Proc. Roy. Soc. Med.* (*Elect.-Ther. Sect.*), 1917, July, 121.

ELECTROTHERAPEUTICS.

Colwell,[1] in two articles, gives a very full and complete account of "The History of Electrotherapy" from the time when the living animal—the torpedo fish—was used as a source of static electricity for the treatment of disease, to the work of Duchenne in 1847, which latter may be said to be the start of modern electrotherapy. Those interested in the subject will find this historical review both illuminating and interesting.

Nerve Testing.—Adrian[2] discusses the physiological basis of electrical tests in peripheral nerve injury, and asserts that with all the improvement of methods and apparatus it is scarcely an exaggeration to say that, as far as any relevant diagnosis or prognosis is concerned, no advance has been made since Erb's work first appeared. Using a galvanic current of known and variable strength and duration, he makes use of the term 'chronaxie' as an expression of the quickness

of the excitation process, and this is very constant for muscle and undamaged nerve, and has a very short duration. For denervated muscle it is much longer. A large series of curves are given, showing the strength-duration curves of human muscles in various conditions as compared with the normal. The paper is a valuable contribution to our knowledge on the subject.

Beginners in this work will find a paper by Hernaman-Johnson[3] on the technique of condenser testing in nerve injuries of value, inasmuch as, after comparing the relative precision of instruments, the writer describes the use of the condenser method and its application to the testing of muscles after the nerve is severed, and also the testing of the nerves themselves. He also describes his method of recording results, and concludes that, although with different observers the personal equation must always come into consideration, nevertheless the condenser system is by far the best of all those known up to the present time. (*See also* NERVES, GUNSHOT WOUNDS OF.)

War Injuries.—Turrell,[4] in opening a discussion on the electrical treatment of war injuries, describes the various methods carried out at the Radcliffe Infirmary, Oxford. He relies to a great extent on *ionization*, using a 2 per cent solution of common salt, large pads, strong currents, and long séances, for rheumatism, septic and indolent wounds, stiff joints, etc. In **Ulcers** and **Indolent Wounds** after a few ionization treatments, this is followed up with the ultra-violet radiations from the tungsten arc. The indications for treatment by Bergonié's apparatus, diathermy, etc., are fully entered into, and the technique adopted is described. One of the most useful and indispensable forms of apparatus for the treatment of wounded soldiers is the static machine. This paper, plus the remarks of the speakers, who took part in the discussion which followed, gives a very fair and clear account of what can be accomplished by the various forms of electrical treatment in conditions arising amongst wounded and sick soldiers.

Electrolysis.—Russ[5] has continued his work on the treatment of **Gonorrhœa** by electrolysis, and advocates the use of a new electrolyte. This solution is sodium chloride 1 per cent and monochloracetic acid ½ per cent. It was tested in the laboratory, and on a series of cases, and the results of the experimental and practical work are given, with the reasons for its action and its use. Russ describes it as the most elaborate and the most rapid, but the least painful, of any local treatment of this disease. In a series of 200, no case of arthritis has arisen during treatment, whilst stricture cannot occur, as there is no ulceration induced in the urethra. The same author,[6] writing on the power of electrolysis to cure **Suppuration,** describes in detail the theory of the treatment and its method of application. Taking an open suppurating wound on a limb as an example, he submerges the lesion in a 1 to 2 per cent sodium chloride solution by means of a glass cylinder made fluid-tight to the healthy skin around by plasticine. A carbon or platinum-foil electrode is submerged in

the fluid, and under the limb is fixed a saline-soaked pad of large size. The pad is made the negative, the disc over the ulcer the positive. The chlorine atoms become linked to bacteria in the granulations, and in moving forward the positive electrode they escort the 'organism' out of the ulcer; there is also a strong germicidal effect produced in the contents of the glass cylinder. It is claimed that septic war wounds can be healed in this way without pain and without the irritating effects of antiseptic solution. The process should be painless, and a warning is given against over-treatment.

Cleveland,[7] on the electrical treatment of **Chronic Wounds,** remarks on some of the fallacies of ionization. In a series of consecutive cases, he used iodide of potassium, sulphate of copper, and salicylic acid on one half, and simple galvanism on the others. The conclusion arrived at was that it was the electric current, and this only, which did good, and that nothing is gained by the so-called 'driving in' of drugs. In pointing out that it is widely held that by means of electricity the action of a drug can be concentrated in diseased tissue, the author considers that this might be true if it were not for the general circulation; but he fails to see how the drug, once having passed the skin, should avoid the general circulation any more than does a solution of morphia given hypodermically. To support this opinion a case is advanced. Copper ionization was given to a subcutaneous tumour, which was excised later, and examined. Not a trace of copper could be detected.

Betton-Massey[8] describes and illustrates his method for the treatment of **Inoperable Carcinoma** by bipolar ionization. The technique is to insert the active needles just beyond the peripheries of the growth, whilst the indifferent, negative electrode is inserted into its centre. As no material amount of current traverses the general body structure, it is possible to push the method to the point of producing a boiling temperature in the larger growths, thus adding heat to the devitalizing chemical action of the dispersed ions of zinc. Both positive and negative electrodes are made of zinc. The same writer[9] uses the unipolar method of zinc ionization for the destruction of small **Epitheliomata** situated at the edge of the eyelids. The small strength of the current required is considered to be favourable for this method of treatment. Photographs of cases before and after indicate the class of case in which this treatment is useful, and also demonstrate its effective results. One or more fine zinc needles are inserted into the middle of such growths, the negative pad being fixed elsewhere on the body surface. By inserting the needles in the diseased tissue alone and observing the whitening effect, the ionization can be confined to the growth and to its growing edges. Complete destruction should be obtained in one application of fifteen to thirty minutes' duration, under local anæsthesia.

Galvanism.—Garton[10] divides **Shell Shock** into two classes: (1) A severe type of traumatic neurasthenia; and (2) A type characterized by hysterical manifestations; and in the former class recommends

'cerebrospinal galvanism.' The best form of apparatus is a battery of wet Leclanché cells with two resistances, one in series and the other in parallel with patient and milliampèremeter. A pad composed of sixteen layers of lint soaked in a solution of sodium salicylate is applied to the forehead, and a metal plate over this is attached to the negative pole. A second pad soaked in plain water is bandaged to the lumbar region and connected to the positive pole. The current is slowly increased, taking twenty minutes to reach a maximum of 20 ma.; this is continued for a further twenty minutes, and then slowly reduced to zero. Cure should result in less than three months.

Nerve Leaks.—A valuable paper by Bayliss[11] on the "Origin of Electric Currents led off from the Human Body, especially in relation to Nerve Leaks," shows very conclusively how important it is that theories and statements should be verified by scientific observation before being accepted as facts. It is in effect an adverse criticism of the views expounded by Mr. Baines, who holds that there is a flow of what he calls 'neuro-electricity' along nerves, which behaves in a manner so similar to ordinary electricity that it passes as such round the coils of a galvanometer. Applied to treatment, this theory was used to advocate the use of what was called 'dielectric oil,' which was to act as an insulator and so stop the leaks. The experiments and investigations of Bayliss proved that this dielectric oil was nothing except liquid paraffin; that the results obtained had no relation to insulating properties; and that the view that neuro-electricity was generated in the brain and escaped from the nerves owing to breakdown of insulation is devoid of evidence and contrary to the knowledge we possess of physiological processes.

Hypochlorous Solution.—Beattie, Lewis, and Gee[12] describe a method of electrically producing hypochlorous solution from hypertonic saline, for use as a disinfectant for **Septic Wounds.** After a preliminary *résumé* of the early experimental work of Lewis on the preparation of the solution, a number of cases are quoted, giving the individual results, and charts are added comparing these results with those obtained by other disinfectants: these appear to substantiate the claims to efficiency of the hypochlorous solution thus obtained. A full description of the apparatus used for its production is embodied in the paper, and the author's conclusions are summarized. The cost of producing large quantities is small, and the method is simple. It should be used when freshly prepared. The bactericidal action is high, and it has the advantage over the antiseptics ordinarily used, that it does not coagulate albuminous material and form a protecting coagulum.

Ultra-violet Rays.—Shunck[13] has made a spectroscopic investigation of some sources of ultra-violet radiation in relation to treatment, and in conjunction with Turrell has carried out therapeutical experiments with a view to determining the limitations of the uses of this method and the manner in which its effects are brought about. These experiments are described in detail, as also are the spectroscopic experiments

and their results, a comparison being made between different kinds of electrodes. Although these experiments seem to prove that the effect of ultra-violet rays is very superficial, the results claimed by Spilzer[14] show that the chemical rays can exert a deep action. Using a modification of the Reyn arc-light bath, he cured cases in which other forms of light treatment as well as *x* rays and radium had failed. In addition to the healing of tuberculous lesions in the mouth, several cases of initial tuberculosis of lung apices underwent resolution.

Turrell[15] calls attention to the fact that tungsten electrodes are the most efficient for the production of ultra-violet radiations, and have an additional advantage in that the cost is comparatively moderate. He describes minutely the construction of the lamp as he has evolved it, and its methods of application. He maintains that in selecting cases for this treatment it is important to bear in mind that the action of the rays is merely superficial, and that the therapeutic effects appear to be due : (1) To the destructive action on micro-organisms ; and (2) To the active hyperæmia which is induced in the superficial tissues. Probably the latter is of the greater clinical value.

Ernst,[16] using a carbon arc light of 20 to 75 ampères for the treatment of **Surgical Tuberculosis,** has exposed patients daily, commencing with half an hour and going up to two and a half hours. In 100 cases he claims, amongst others, that 29 of ulcerating and fistulous lymphomatas, 4 of fistulæ and ulceration after laparotomy for tuberculous peritonitis, 26 of spina ventosa, and many cases of tuberculous disease of joints were cured : in most of the latter cases with normal motility of the joints. All the cases were kept under observation for a considerable time after their cure.

References.—[1]*Arch. Rad. and Elect.* 1916, Feb., 296, and 1917, March, 320 ; [2]*Ibid.* 1917, May, 379 ; [3]*Lancet*, 1917, ii, 117 ; [4]*Proc. Roy. Soc. Med.* (*Elect.-Ther. Sect.*), 1917, Jan., 37 ; *Lancet*, 1916, ii, 790 ; [5]*Brit. Med. Jour.* 1917, i, 616 ; [6]*Arch. Rad. and Elect.* 1917, Jan., 241 ; [7]*Clin. Jour.* 1916, Nov., 418 ; [8]*Med. Rec.* 1916, ii, 585 ; [9]*N.Y. Med. Jour.* 1917, i, 731 ; [10]*Brit. Med. Jour.* 1916, ii, 584 ; [11]*Proc. Roy. Soc. Med.* (*Elect.-Ther. Sect.*), 1917, May, 95 ; *Brit. Med. Jour.* 1917, i, 387 ; [12]*Brit. Med. Jour.* 1917, i, 256 ; [13]*Jour. Röntg. Soc.* 1917, April, 25 ; [14]*Med. Rec.* 1916, ii, 1169 ; [15]*Lancet*, 1916, ii, 790 ; [16]*Surg. Gyn. and Obst.* 1916, ii, 582.

Part II.—The Dictionary of Treatment.

A REVIEW OF MEDICAL AND SURGICAL PROGRESS FOR 1917, BY MANY CONTRIBUTORS.

ABDOMEN, GUNSHOT WOUNDS OF.

E. Wyllys Andrews, M.D., F.A.C.S. (Chicago).

The literature of gunshot wounds of the abdomen this year is so vast that an adequate review is here impossible. Literally thousands of cases have been reported and tabulated. Comparison of results is impossible, because of the widely different conditions under which the wounds occurred in France, Belgium, Serbia, Egypt, and Mesopotamia. Study of these reports brings out several important points.

Diagnosis of the viscera injured is extremely difficult, especially as to whether perforation of a hollow viscus has occurred. It is evident now that a bullet may traverse the abdomen without perforating the gut, especially in the upper portion. Many such abdomens have been opened unnecessarily. This explains the results of those who advocate abstention from operation. The cases which recovered had no penetrations of the digestive tract, as later experience has shown beyond a doubt that practically every case of perforated gut dies unless operated on.

If the wounds of entrance and exit are both present, the course of the track is evident and the injury done may be better estimated; but even this is often misleading, as the track may not be straight, especially if the velocity is low. About two-thirds of all bullet wounds are through-and-through, but about 65 per cent are caused by shell fragments or grenades, which are of lower velocity, and the fragments are usually retained.

	Bullet	Shell fragment	Shrapnel	Bomb or grenade
Out ..	203	30	15	6
Retained	131	254	67	128
Total ..	334	284	82	134

With only one wound, the estimation of the direction of the track is often impossible. Rigidity is a deluding sign. Chest or diaphragm injuries may cause it. It is nearly always present in all types of

cases. Localized muscle spasm seldom occurs, and does not usually signify localization of the injury done. Time as a factor in prognosis is of the utmost importance. The following table is interesting as showing the effect of time on the mortality :—

Hours	2	4	6	8	10	12	14	16	18	20	22	24 and over
To base	3	30	75	55	34	19	7	4	11	4	0	27
Died ..	2	30	53	59	41	23	10	12	15	11	4	52
Total	5	60	128	114	75	42	17	16	26	15	4	79

After thirty-six hours the chances of recovery are almost nil, and owing to this fact the armies are making every effort to get these cases in as rapidly as possible. In spite of this, most surgeons are giving many of the patients half an hour to two hours' rest and stimulation before operation. The reaction and lessening of shock thus attained have reduced the immediate operative mortality immensely.

Shock, in war surgery at least, seems to be simply a matter of arterial tension, and the pulse is the best and almost the only indication of it. Pulse over 140 is a very grave pre-operative sign. Many patients are brought in with a very high feeble pulse, or pulseless. A number of these, after a short rest in bed, following the tiresome and painful ambulance journey, and after the administration of hypodermic saline, adrenalin, and strychnine, have a much better pulse and strength and make fair operative risks. If these had been operated immediately, the operative shock would have been fatal in many cases.

As to treatment, the incision may be made either to include the wound or in the mid-line. In either case the track should be completely excised down to the peritoneum. The peritoneum should be carefully wiped free of blood and all hæmorrhage controlled. Flushing is not desirable. A systematic search of the entire abdomen is necessary. The usual routine is to begin at the ileocæcal valve and go up and down. Perforations found should be closed with a sponge and clamp until all are found. This prevents one doing several resections within a few inches when one might have included all the injuries. Speed is essential. Closure by suture is always the method of choice, even if slight narrowing results. Resection gives a much higher mortality than several closures. Many times the condition of the patient necessitates rapid closure of the abdomen by through-and-through stitches. If possible, however, the peritoneum should be closed separately. All wounds need stay sutures, as many of these suppurate or break open. Drainage is not necessary in simple wounds if the projectile is removed, but all extensive wounds, especially if of long duration, need drainage.

The following statistical results given by Wallace are instructive :—

SUMMARY.

Total number of cases	1288
Arrived moribund	250
Total mortality (excluding moribund)	50·06 per cent
,, ,, (including moribund)	60·2 ,,
Considered with view to operation	1038
No operation considered advisable	73
Total operations	965
,, operative mortality	53·9 per cent
,, hollow-viscera mortality	64·7 ,,
*Stomach mortality	52·7 ,,
*Small-gut mortality	65·9 ,,
*Colon mortality	58·7 ,,

* Uncomplicated by any other intestinal lesion.

DETAILS OF OPERATIONS, ETC.

Note.—This table shows the number of individuals operated upon. In the case of the intestinal tract it shows the number of times the different parts were hit. The bladder and solid organs only appear in the table when they were the principal viscera damaged. To ascertain the number of times they were injured, the body of the article must be consulted.

Operations	To Base	Died	Total
Suture of stomach	26	29	55
,, ,, and small gut	4	6	10
,, ,, and small gut ; gastrojejunostomy	—	2	2
,, ,, and great gut	2	3	5
,, ,, and colon ; gastrojejunostomy	—	1	1
,, ,, small gut, and colon	—	3	3
,, ,, resection of small gut ; gastrojejunostomy	—	2	2
,, ,, and colon ; resection of small gut	—	1	1
,, ,, resection of small gut ; gastrojejunostomy ; colon anus	—	1	1
,, ,, colon anus	—	2	2
Resection of small gut ; circular enterorrhaphy	18	69	87
,, ,, lateral anastomosis	8	18	26
,, ,, gastrojejunostomy	—	2	2
,, ,, suture of colon	4	17	21
,, ,, colon anus	1	14	15
,, ,, suture of rectum	—	3	3
Suture of small gut	59	71	130
,, ,, and colon	16	26	42
,, ,, resection of colon	—	1	1
,, ,, colon anus	1	5	6
,, ,, and rectum	—	1	1
Small-gut anus	—	7	7
,, fistula	2	1	3

Continued on next page

DETAILS OF OPERATIONS, ETC.—*continued.*

Operations	To Base	Died	Total
Suture of colon :			
Cæcum	8	5	13
Ascending colon	13	12	25
Hepatic flexure	7	9	16
Transverse colon	5	8	13
Splenic flexure	4	6	10
Descending colon	6	3	9
Pelvic colon	7	9	16
Colon anus	13	36	49
On rectum : intraperitoneal wounds	1	2	3
,, extraperitoneal wounds	2	3	5
Proximal colostomy	4	10	14
Cœliotomy : no hollow viscus perforated	77	30	107
,, non-penetrating wound	12	3	15
On liver	76	38	114
On kidney : exploration	25	7	32
,, nephrectomy	6	7	13
For wounds of bladder : Extraperitoneal			
Suprapubic cystostomy	6	9	15
Drainage of wound ..	3	1	4
Suture	—	1	1
,, ,, Intraperitoneal			
Suprapubic cystostomy	—	1	1
Suture	2	2	4
For wounds of spleen : exploration	12	4	16
,, ,, splenectomy	4	12	16
For fæcal abscess	1	6	7
For loss of belly wall	—	1	1
For prolapse of viscera	6	3	9
Tube to pelvis	—	4	4
For contusion of belly	—	2	2
Loin wound enlarged	3	2	5
No operation (no indication)	69	4	73
No operation, moribund	—	250	250

REFERENCES.—Wallace. *Brit. Jour. Surg.* 1917, April, 679; Lockwood et alt. *Brit. Med. Jour.* 1917, i, 317; Walters et alt. *Lancet*, 1917, i, 207; Fraser and Drummond, *Brit. Med. Jour.* 1917, i, 321; Quénu, *Le Bull. Méd.* 1916, Oct.; Armstrong, *Lancet*, 1916, ii, 82; Crisp, *Ibid.* 746; Dunn and Drummond, *Brit. Jour. Surg.* 1917, July, 59; Rouvillais, *Bull. et Mém. Soc. de Chir. de Paris*, 1917, xliii, 705.

ABDOMINAL WALL, SURGERY OF.

E. Wyllys Andrews, M.D., F.A.C.S. (Chicago).

Moschowitz[1] reports 97 cases in which he used the Sprengel transverse incision in the upper abdomen. His results were excellent, no hernias occurring, and he urges its wider adoption. It has the advantage of not severing the nerve fibres and not loosening the insertion of the lateral muscles. Division of one rectus is usually enough, as

the other can be retracted. The closure is simple and secure. The rectus is fastened to its anterior sheath by several through-and-through sutures (*Fig.* 4). Then the peritoneum is closed with a running stitch (*Fig.* 5). The ends of the rectus are joined by several mattress sutures (*Fig.* 6), after which the anterior sheath is sutured by a row of closely-apposed interrupted stitches (*Fig.* 7).

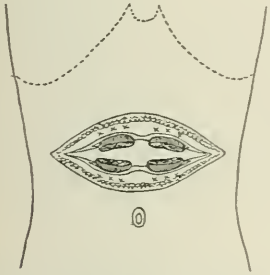

Fig. 4.—Double transverse sutures to fasten the rectus to its anterior sheath.

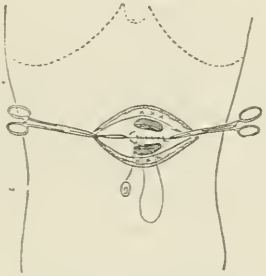

Fig. 5.—Suturing of the peritoneum and posterior sheath of the rectus.

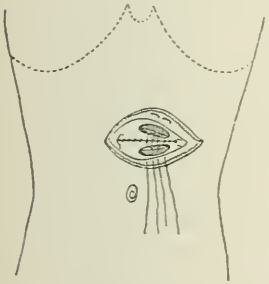

Fig. 6.—Mattress sutures to approximate the divided rectus.

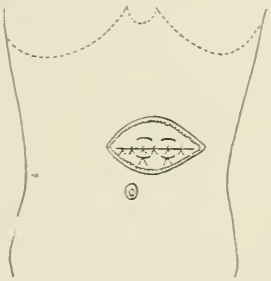

Fig. 7.—Suture of the anterior sheath of the rectus.

Reproduced from 'Annals of Surgery.'

Chaput[2] describes an interesting innovation in the closure of the abdominal wall. He says catgut is not durable enough. Silk and linen are too fine, and they cut through. Wire cuts, and does not appose the muscles well. Therefore he has devised a method by which silkworm gut can be used for the closure of the fascia and muscles. This is tied with a slip knot attached to a silk thread. At the end of fifteen days the silk is pulled out, loosening the entire row of knots, and the silkworm gut is easily pulled out at one end of the wound.

The use of **Alcohol** as a disinfectant in abdominal operations (p. 2).

References.—[1]*Ann. Surg.* 1916, Sept., 260; [2]*Presse Méd.* 1917, July, 410

ACETONÆMIA, AND ACID-INTOXICATION IN CHILDREN.

Frederick Langmead, M.D., F.R.C.P.

J. Thomson[1] makes an important distinction between certain conditions which are often loosely named. Acetonæmia indicates an abnormal amount of acetone in the blood. It is worthy of attention, not because acetone itself is harmful, but because its presence practically always implies that of the other two members of the acetone series—β-oxybutyric acid and diacetic acid—and these are a real source of danger to health. The word *acidosis* may be conveniently used to denote an acid state of the blood from whatever cause it may have arisen, and whether it is producing symptoms or not. When it causes symptoms the serious condition of *acid-intoxication* is present. The cases of acidosis with acid-intoxication which are met with in clinical work are generally due to the acids of the acetone group, but there are also clinical types of acid-intoxication dependent on other acid substances. Thomson divides the conditions under which acidosis occurs into three groups :—

1. *Physiological Acetonæmia.*—This may arise merely as a temporary inadequacy of the metabolic processes, and may be set up by the child taking too little food, or by his foodstuffs being given in unusual forms or in unwise proportions—too much fat or too little carbohydrate—so that his chemistry has been deranged, although probably only in a passing and harmless way. There is no reason to suppose that this slight acetonæmia predisposes the child to post-anæsthetic poisoning or other dangerous forms of acid-intoxication. In anxious cases, however, it is probably advisable to delay operation if possible till the physiological acetonæmia has either passed off, or been stopped by the administration of **Glucose** and **Sodium Bicarbonate.**

2. *Acetonæmia as a Complication.*—This may be met with in various sorts of septicæmia, in diarrhœa, peritonitis, intestinal obstruction, severe vomiting, poisoning from phosphorus and other drugs, pneumonia, diphtheria and many other fevers, tuberculous meningitis, spasmophilia, etc. In these conditions the acetonæmia does not affect the diagnosis, nor generally the prognosis, to any extent ; and the treatment is that of the original disease, along with the administration of **Alkalies, Laxatives,** and easily assimilable **Carbohydrates.**

3. *Acetonæmia as a Cardinal Symptom of various forms of Toxæmia.*—In such cases the early recognition and prompt treatment of the acid-poisoning is all-important. The main types of which this may be said are diabetic acetonæmia, post-anæsthetic acetonæmia, salicylate poisoning, and recurrent or cyclical vomiting ; but there are probably various other types belonging to this group.

The author then discusses these conditions seriatim.

Diabetic Acetonæmia.—In diabetes the risk of acid-intoxication passing on to coma is particularly great in early life, and we must be constantly on our guard to try to prevent it. For this purpose regular action of the bowels must be ensured, but at the same time any tendency to diarrhœa must be checked, and the urine should be kept

mildly alkaline. Carbohydrates must not be too restricted, and an excess of fat must be avoided. When signs of acid-intoxication appear, vigorous measures are called for. A **Purgative** should be given at once, and **Bicarbonate of Soda** by the mouth, in doses of 30 gr. every two hours in a tablespoonful of water, or if vomiting is severe, by the rectum (2 dr. in 8 oz. of water every six hours). In extreme cases a few ounces of a 5 per cent solution of bicarbonate of soda may be injected into a vein. It is also advisable to increase the child's fluid by the subcutaneous injection of **Saline Solution.** An ounce or two of a 10 per cent solution of **Glucose** may be given by the mouth or as an enema. The child must be carefully guarded from excitement and from all other causes of exhaustion. **Morphia** $\frac{1}{20}$ gr. for a child of three or four, and $\frac{1}{10}$ gr. for one of ten years, is sometimes helpful in allaying the vomiting.

Post-anæsthetic Acetonæmia.—The administration of chloroform, ether, or any other general anæsthetic, always induces some degree of temporary acetonæmia, which occasionally leads to acid-intoxication, and is therefore not without danger. Ether produces a greater degree of acetonæmia than chloroform, but is less harmful, for it damages the cells of the liver and kidneys less. The symptoms may come on within a few hours or be deferred as much as three days. The amount of drug used and the length of administration seem to have little or nothing to do with the occurrence of poisonous symptoms. Acetonuria before the operation is only of importance if it be of the acute type, when the danger is certainly great, especially if chloroform be used. With acid-intoxication after an anæsthetic the prognosis must always be guarded. The risk is naturally greater when septic conditions are present, and in such cases ether should always be preferred. Similar measures are indicated as for diabetic acetonæmia, and must be begun energetically at once. If there is reason to anticipate danger from anæsthetic poisoning in a case, the following precautionary measures may be taken : (1) For two or three days before the operation the patient should have sufficient **Bicarbonate of Soda** to render his urine alkaline. (2) During the same time the fat in his food should be diminished as far as possible, and he should have plenty of carbohydrates. (3) A few ounces of a 10 per cent solution of **Glucose** may be given by the mouth several times a day in place of less easily assimilable carbohydrates, and two hours before the operation an enema of the same solution. (4) The child must be carefully guarded from excitement, anxiety, and fright. (5) The urine should be tested for acetone ; if any be found, it would probably be advisable to delay the operation until further examination has made it certain that the condition is not of an acute and dangerous form.

Salicylate Poisoning.—He points out that the time-honoured symptoms—headache and tinnitus—are seldom complained of, and that the depressing effects are rare and not usually dangerous. The advent of the usual symptoms of acid-intoxication—restlessness, vomiting, thirst, air-hunger, delirium, and drowsiness—is the real sign of danger,

and these symptoms may end in coma and death. Quite a small dose may produce them in predisposed children unless proper precautions have been taken. These are, the regulation of the bowels by aperients, and the administration with the salicylate of twice the quantity of **Sodium Bicarbonate.** If acid-intoxication develop, the drug must be stopped promptly, a purgative given, and bicarbonate of soda continued in doses of 30 gr. every hour, or every two hours. In from twelve to twenty-four hours after the symptoms have subsided, the salicylate may be begun again in smaller doses and gradually increased. Evidently the kidneys and liver are little damaged, and soon acquire the capacity to deal with an excess of acetone.

Recurrent (Cyclical) Vomiting.—In his description of this condition Thomson remarks that the attacks, usually mild, may sometimes be accompanied by signs of acute acid-intoxication, suggesting the possibility that the altered character of the illness must be accounted for by the presence of a complication. In one case a very severe attack seemed to be due to coincident influenza. Though the children who are subject to recurrent vomiting are not usually obviously neurotic, he has noticed in several of them a history of their having had asthma, urticaria, eczema, stammering, and other nervous complaints. In many cases uric-acid crystals or a copious deposit of urates have been noted in the urine. In two instances patients who had suffered from pyloric stenosis in infancy developed this disease in later childhood. His experience of the more severe type of case in which acid-intoxication appears, leads him to state that a large proportion of the examples end fatally. He has met with a form in which there is recurrent pyrexia, with or without headache, and with little or no vomiting, and regards it as of the same nature and needing the same treatment. Like other observers he has noted several cases of recurrent vomiting in which the children developed migraine in later life. In both diseases there is often a family history of gout and various manifestations of an unstable nervous system. The prognosis must always be guarded, but the attacks generally lessen in frequency and severity under treatment, and then often cease altogether. There is a tendency to spontaneous recovery at puberty.

When an attack begins, the patient must be kept in bed and the bowel emptied by a purgative or, if that is vomited, by an enema. In most cases decided improvement follows the administration of **Bicarbonate of Soda** in large doses (120 to 180 gr. or more in the day). So long as the vomiting continues, all food by the mouth, including liquids, should be withheld. Sometimes a soothing and settling effect may be obtained by washing out the stomach or giving a large drink of warm water and soda, which is generally vomited immediately. Occasionally, if there is no suppression of urine, an injection of morphia may be of service. Saline enemata relieve the distressing thirst and encourage the action of the kidneys.

Between the attacks the **Diet** should be carefully regulated, and all over-eating prevented. Excess of fat must be avoided, little butter

being allowed, and no cream ; in bad cases milk should be skimmed. Green vegetables and fruit in moderation are beneficial. A cupful of hot water on waking in the morning, with or without the addition of Vichy water, is often useful. Great improvement sometimes follows the use for long periods of **Salol** (3 gr.) or **Salicylate of Soda** (3 to 6 gr.) with **Bicarbonate of Soda** (5 to 10 gr.) according to age. These should be given thrice daily about an hour before meals, and should be continued for weeks. The regular action of the bowels must be carefully attended to. It is important to avoid all causes of exhaustion.

A Campbell Starr[2] believes that cases of acidosis are very common, but usually unrecognized because the urine is not examined. The latter, as he points out, furnishes the chief diagnostic sign in the presence of acetone and diacetic acid, but in only a small proportion of cases in which these bodies are found is the clinical picture clear enough to constitute a clinical entity. Among the symptoms he regards the acetone of the breath as the most constant, but both it and the vomiting, which is considered to be so characteristic as to give the name 'cyclical vomiting' to the condition, may be absent in some of the worst cases. The degree of prostration is often considerable, the child being half comatose and obviously feeling very ill; and in one case which recovered he has noted definite meningeal symptoms, accompanied by Kernig's sign. [Such symptoms have not infrequently led to a wrong diagnosis of meningitis, with recovery.—F. L.] Perhaps the fact that he has seen no fatal case explains his statement that albumin is absent from the urine, for this is not invariably true. In the treatment he considers it useless to give sodium bicarbonate, and prefers the **Potassium** salt. This should be combined with plenty of water, free purgation with **Calomel**, and an abstinence from fats.

J. M. Grantham[3] advises that the alimentary canal should be thoroughly emptied by **Castor Oil** or repeated doses $\frac{1}{10}$ gr. of **Calomel**, combined with irrigation of the colon. During the first day the **Diet** should consist of a 7 per cent solution of milk-sugar, and afterwards of 1 per cent barley-water to which milk-sugar is added When food cannot be given by the mouth, 5 per cent **Glucose Solution** should be administered by the rectum. Like most writers, he recommends a saturated solution of **Bicarbonate of Soda** to render the urine alkaline, and of this a tablespoonful in some ice-water may be the initial dose, to be repeated hourly, and increased if the patient can take it. In very severe cases he recommends that 1 or 2 drachms of a 4 per cent solution of sodium bicarbonate be given intravenously, and repeated if necessary.

Göppert[4] affirms that the form of acidosis known as 'cyclical vomiting,' or 'periodic vomiting,' may be arrested at once by distending the stomach with warm water. He gives the child 250 or 300 grms. of warmed mineral water—**Carlsbad** or an **Alkaline-saline Carbonated Water.** The addition of sugar may induce the child to take it more readily, and he should be urged to refrain from vomiting

the fluid. As soon as the stomach becomes distended, the tendency to vomiting stops at once. Washing the fluid out again perpetuates the benefit. A litre or two of hot tea injected into the rectum and retained, may also answer the purpose.

Blood Transfusion tried successfully (p. 6).

References.—[1]*Edin. Med. Jour.* 1916, Nov., 298; [2]*Brit. Med. Jour.* 1916, ii, 756; [3]*Jour. of Florida Med. Assoc.* 1916, July (abstr. in *N. Y. Med. Jour.* 1916, ii, 469); [4]*Ther. Monats.* 1916, Dec. (abstr. in *Jour. Amer. Med. Assoc.* 1917, i, 744).

ACNITIS. (*See* Tuberculide.)

ACRODERMATITIS HIEMALIS. *E. Graham Little, M.D., F.R.C.P.*

Hartzell[1] describes a series of five cases of this disease so named by Crocker, with the following characteristic features. The eruption was made up of a limited number of small, flat, dull-red papules, a lesser number of small, erythematous patches, and a few discrete vesicles, strictly limited to the fingers in the majority of cases, but occurring in one case upon the toes, and in one upon the ears, coming out in crops, at intervals of two or three weeks, in the autumn and winter only, and accompanied by severe itching and burning. All of these cases occurred in young adults who were apparently in normal health, although the first case exhibited a marked cyanosis of the hands in cool weather. Pustulation and consequent scarring, which have been described in many of the recorded cases, was absent. They have usually been regarded, as Crocker suggested, as a form of tuberculide, and chilblains are a frequent association. In three of Hartzell's cases, though occurring in winter, the eruption began when the temperature varied between 56° and 49°, and receded with a drop to colder figures. Itching and burning were constant symptoms. The most effective treatment was painting with **Ichthyol**, a 25 to 30 per cent solution in water being applied at night and washed off in the morning.

Reference.—[1]*Jour. Cutan. Dis.* 1916, Nov., 791.

ACRODERMATOSIS OF THE TROPICS.

E. Graham Little, M.D., F.R.C.P.

Under this name, which should not be confused with the preceding disease, Ruiz-Arnau[1] describes a recurrent dermatosis common in Porto Rico, and affecting the hands and feet, especially the latter. He regards the primary cause as a permanent lymphectasia, induced by sojourn in tropical climates, quite independent of parasitic factors, but paving the way often for the latter. It requires a certain interval to develop, and may be mitigated or cured by removing to non-tropical latitudes. The change is essentially a varicose enlargement of lymphatic capillaries, on which is grafted the dermatosis. This makes its appearance as papular elevations of the size of a pinhead or larger, painful under pressure, vesicating in a few hours, and forming blisters the size of a shirt button or larger, until it bursts, revealing

a central crateriform depression from which discharge persists for a certain time as a rule, though it may dry rapidly. The individual lesions last on an average for five to seven days, but the condition may continue for months. The feet are more commonly attacked than the hands, usually one after the other. In the hands there is close simulation of eczema; it rarely spreads beyond the wrist to the forearm. Recurrences are frequent, especially at certain seasons, corresponding to the changeable as compared with settled conditions of weather. The complaint begins with a violent itching of the parts ultimately the seat of eruption, and the inevitable scratching increases the congestion.

The best treatment is to take to bed, to apply in the early prevesicular stage a solution of **Picric Acid**, 12-1000. With the passing of the first stage the parts should be fomented with this solution for a few minutes :—

R	Sodium Borate	5 grms.	Boiling filtered water	1 litre
	Boric Acid	40 grms.		

To be applied twice daily.

And then an ointment of **Ichthyol** in vaseline 1-6. Or this formula may be used :—

R	Zinc Oxide	5 grms.	Lanolin	
	Carbolic Acid	50 grms.	Vaseline	āā 15 grms.

Sprinkle on this a good quantity of Borated Talcium.

In the later stages a drying powder such as **Dermatol** may be used with advantage.

REFERENCE.—[1]*Med. Rec.* 1916, ii, 677.

ACTINOMYCOSIS. *Herbert French, M.D., F.R.C.P.*

Another case of human actinomycosis of the parotid region is recorded by C. W. Dean[1] in a farm labourer, age 18. After iodide of potassium had been given in large doses over a long period without obvious effect, Dr. Dean says, "I then wrote to Dr. Leonard Colebrook, of St. Mary's Hospital, who replied: 'I have had very satisfactory results with **Vaccine** in a number of cases, particularly those of the jaw, but only if combined with efficient drainage. And may I add a point that seems to me of great value in the surgical treatment, namely, the advantage of curetting with a dry swab as opposed to a sharp instrument, and I advise it for this reason—the infected tissues in this disease seem to be sharply defined, and with a dry swab they can frequently be removed entirely if the focus is small, leaving a clean boundary of apparently uninfected tissue, which heals straight away. With a sharp instrument there is more chance of spreading the infection. I use the vaccine in doses of 3 to 10 million fragments about once a week.'

"I carried out Dr. Colebrook's suggestions as to surgical treatment. The boy is now, as far as I can tell, perfectly well; the wounds are healed, and the swelling has quite gone down. The only thing is

a slight œdema of the cheek, as if from some obstruction to the lymphatic return, due to very firm contraction of the healed tissues. Only four doses of vaccine were required in all, each dose consisting of 25 million fragments; improvement was obvious after the first dose, and, after the fourth, cure was apparently complete."

Injections of **Milk** have been found useful (p. 20).

REFERENCE.—[1]*Brit. Med. Jour.* 1917, i, 82.

ADDISON'S DISEASE.

Found to produce a marked tolerance of **Adrenalin** (p. 2).

ADENOIDS. *J. S. Fraser, M.B., F.R.C.S.*

Anæsthesia in Adenoid Operations.—In infants under one year M'Kenzie[1] holds that no anæsthetic is necessary for the removal of adenoids. From the second year onwards till puberty he uses ethyl chloride. After puberty he advises nitrous oxide with or without ether for adenoid cases, but states that chloroform is necessary for the removal of tonsils in adults, i.e. if a general anæsthetic is needed at all. In America and in many clinics in this country ether is used instead of chloroform. Crowe, Watkins, and Rothholtz[2] advise general anæsthesia (ether) in every case of tonsillectomy.

According to Alexander,[3] the advantages of performing adenoidectomy with local anæsthesia are its safety, simplicity, and speed, together with absence of pain and slight amount of hæmorrhage. After anæsthetizing the posterior faucial pillars, soft palate, and post-nasal space by applications of 20 per cent cocaine, the surgeon injects into the submucous tissues of the post-nasal space under the adenoids 3 to 4 c.c. of a 1 per cent solution of novocain containing 3 drops of adrenalin. The injections are made with a 2 c.c. glass Record syringe and a specially constructed needle 12 cm. in length, curved upwards, at its distal end. The points for infiltration are one on either side, high up in the post-nasal space. These are reached by placing the needle against the soft palate, pushing it upwards, and plunging the needle through the entire body of the adenoid tissue to the submucous tissues beneath. A third injection is made just behind the soft palate in the posterior wall of the pharynx in the middle line.

REFERENCES.—[1]*Pract.* 1917, Aug.; [2]*Johns Hop. Hosp. Bull.* 1917, Jan.; [3]*Jour. Ophthal. Otol. and Laryngol.* 1917, 157.

Frederick Langmead, M.D., F.R.C.P.

Marfan[1] believes that adenoids in infants under three months old are due exclusively to inherited syphilis, and that even up to the age of two years syphilis is a frequent factor. In his view they provide corroborative evidence of a syphilitic taint. Other causes are tuberculosis, chronic digestive disturbance, or protracted or recurring bronchopneumonia, whilst chronic infections and toxæmias generally and also rickets, play their part at certain periods of development. Liability to snore during inspiration is an important sign. The snoring does not cease when the nostrils are pinched together, but

the child begins to suffocate if its mouth is forcibly closed. If the air-passages are permanently obstructed, the child is unable to suck the nipple properly, and may suffer from a slight intermittent or spasmodic cough. Attention should always be paid to the ears in such cases, and they should be examined with care, lest an unsuspected otitis media should be followed by deafness. Want of this precaution may lead to the discovery that the child has been growing up as a deaf-mute undetected until as late as nearly two years old.

Treatment.—Specific treatment is very beneficial in the syphilitic cases, particularly if it is employed early. Under six months it may be so pronounced as to render operation unnecessary. His usual treatment is by inunctions of **Mercury,** but in three recent cases he has employed **Arsenobenzol** with equally good results. In one case the adenoids disappeared completely in three weeks. He is very conservative in his treatment of adenoids in children under four, warning against operation because of the tendency to recurrence. Part, however, may be snipped off, with consequent relief of the symptoms. He records one case where a piece the size of a bean was clipped off by forceps. Respiration was much improved, but blood oozed for two weeks. A guinea-pig injected with the tissue developed tuberculosis. He advises tonic treatment, and has used calcium and epinephrin with good results, administering from 0·1 to 0·25 grm. **Calcium Glycerophosphate** with the first meal of the day; and at noon and night, before feeding, two or three drops of solution of **Epinephrin** (1–1000) in a little water. This combination was continued systematically for two weeks in each month. A possible disadvantage is that epinephrin by the mouth may induce diarrhœa. In a syphilitic it may be well to employ this form of treatment after the specific therapy. For a child not subject to catarrhs and free from eruptions, he orders a **Salt Bath** at a temperature of 35° C. for six or ten minutes twice a week, rubbing the skin after drying with a woollen glove, moistened with a little alcohol. Sea air is beneficial, but if there is a tendency to ear trouble it is wiser not to send the child to the seaside. For local treatment he introduces into each nostril, two or three times a week, a few drops of a mixture of 0·5 grm. **Eucalyptol** in 30 grms. of fluid **Petrolatum.** In the case of syphilis a **Calomel** ointment may be used. For acute inflammation of the adenoids he instils, three times a day, five or six drops of a 1 per cent solution of **Colloidal Silver.**

References.—[1]*Le Nourrisson*, Paris, 1917, March 5, No. 2, p. 65 (abstr. in *S. Afric. Med. Rec.* 1917, Aug. 11, 2010).

ALCOHOLISM AND THE DRUG HABIT. (*Bedford Pierce, M.D., F.R.C.P.* (*Kate Haslam, M.D.*

Smith Ely Jelliffe,[1] in discussing the mentality of the alcoholic, says that "the problems of the alcoholic are fundamentally individual mental problems; they lie in the psychic sphere, and it will be only through the psychological mode of approach that it will be possible to comprehend those pragmatically philosophical principles which it

is the aim of science to formulate." He asks, "What does alcohol give?" and says, "Alcohol is the great mental vivisector: it cuts man into his primary principles. All those successive integrations of nervous functioning that evolution has built up are recessively disintegrated by alcohol. The effort of intelligence to supplant and augment instinct, which is the great new achievement in creative evolution, is thwarted by the action of alcohol, and under its influence man returns by successive stages along the paths he has travelled in his upward evolution. . . . What, then, does alcohol do for the individual? It changes the outside environment; it pushes fixed laws away from consciousness; it enables him to get away from things as they are." The author points out what a mighty force the unmeasured accumulation of past ages is in the individual, and thinks that "there alone can be an answer to the question why he seeks forgetfulness of the present and desires to return to the sway of instinct which alcohol can give." He reviews the field of modern analytical work, and concludes a suggestive paper by saying, "It is the freeing and redirecting of his dynamic activity of which the alcoholic stands in need. It is this which will make him the servant, no longer the burden, of society."

Menas S. Gregory[2] also pleads for "a systematic and correlated study of all the phases of inebriety, and would particularly emphasize the mental and psychological side of the problem." After reviewing the influence of alcohol in the primitive stages of human existence, and discussing the character of the problem in human nature that makes the use of alcohol so persistent a habit in society, he says that "psycho-analytic psychology, with its dynamic theory of transmutation and shifting of energy, has afforded some limited insight into the nature of this intricate problem." He points out that the intoxication motive is closely related to the primal impulse, and therefore alcoholism and inebriety may be regarded as psychological problems. He says it must be remembered that alcohol "is not only an escape from life at high levels, but it also serves as a means of sublimation for potentialities more destructive and ignoble," and considers that some substitute must be offered. "If the saloon is abolished, something must be offered in its place which can fulfil whatever psychological service it has rendered, its socialization, its flights, its escapes." He concludes—"Social mal-adaptation is the prolific source of the most important diseases which interfere with the richness and fullness of human life. Community problems are individual problems. Prostitution, criminology, child welfare, labour legislation, health insurance, and inebriety cannot be adequately understood or successfully arranged if they are thought of as isolated problems. They are interdependent and organically related. They all proceed from the innermost and oldest impulses of mankind which are bound up in the unconscious of each individual, producing this vast conglomeration which we call human life and human endeavour."

C. B. Pearson[3] considers the question of volition with regard to the

management of drug and alcoholic addictions, and says that volition does not play as important a part in the treatment and prognosis of drug addiction as is generally supposed to be the case. He states that the weak-willed person is easier to manage after he becomes an addict than the strong-willed person who becomes an addict.

Considering the causes of relapse, so far as *morphine* is concerned, fatigue is the most frequent cause, the fatigue being more in the nature of collapse ; the patient is thoroughly frightened and turns at once to morphia ; therefore, clear instruction as to the condition is necessary. The next most frequent cause is whisky. He considers that the weakened will should be used to some extent, but not tasked beyond endurance, and he states that " any physician can learn to gauge correctly what the will will bear if he can and will give the matter proper study and attention."

F. Nuzum and E. R. L. Count[4] report the results of investigating water-absorption by brain tissues from people who died of delirium tremens and other diseases, normal brains being used as controls. The two hypotheses for investigation were : (1) Is the presence or absence of brain œdema entirely dependent on conditions within the brain cells themselves ? or (2) Is the presence of an œdema dependent on the availability of fluid ? The authors believe that the following statements may safely be made as a result of their investigation :—

1. A gross œdema of the leptomeninges was present in 45 per cent of the brains used in their study.

2. The brains of 20 persons dead from delirium tremens, removed from the body on an average twenty hours afterwards and immersed in distilled water for forty-eight hours, showed hydration capacities exceeding those observed in any other condition encountered among 130 miscellaneous necropsies, with the exception of three instances of uræmia, one of morphine poisoning, and those of cerebral embolism and hæmorrhage.

3. The brains of rabbits dead of experimentally-produced chronic alcoholism (daily intoxicating doses of alcohol by stomach for from two to four months) were not grossly œdematous, but possessed a post-mortem hydration capacity even greater than that of human brains, and 8 per cent in excess of normal rabbit brains.

4. These indications of an alteration of the hydration capacity of the brain colloids may be assumed to be the result of tissue asphyxia and the resultant accumulation of acids secondary to the action of the narcotic alcohol.

5. Such an interpretation is in some measure supported by the very high hydration capacity observed with uræmia in which clinically an acidosis is known to exist.

Treatment.—L. P. Spears[5] describes his treatment of cases in a public institution. He considers that an insidious toxæmia of intestinal origin is the determining cause of the outbreak in most instances. He would summarize the entire treatment as " *Remove the drug.*" A mild attack is treated with **Calomel** gr. v and **Sod. Bicarb.** gr. xv, a

Hot Bath, and plentiful libations of **Hot Water.** He cuts off alcohol absolutely from admission, but gives a mixture of **Capsicum** 3 oz. and fluid extract of **Lupulin** 1 oz. in drachm doses at intervals of two to six hours. This helps the patient to take food. Solid food is undesirable until free purgation has been secured by salines; milk rendered alkaline, or buttermilk, is used. For sleep, which is a desideratum, **Veronal** is used exclusively, given in large graduated doses. The heart, he considers, requires a sedative in the acute stage, and stimulation later. The most difficult cases are the users of morphine and cocaine combined.

E. A. Leonard[6] gives a preliminary report of twelve cases of delirium tremens treated by **Intraspinal Injections of Magnesium Sulphate.** A single lumbar puncture was performed, and 10 to 40 c.c. of cerebrospinal fluid were withdrawn, the patient being in a sitting posture; 1 c.c. of a 25 per cent solution of chemically pure magnesium sulphate specially prepared in ampoules, for every 25 lb. of body weight, was then introduced into the canal, and the patient placed in a semi-recumbent position. There were ten recoveries and two deaths.

James J. Hogan[7] reports on 64 severe cases of delirium tremens. He considers that practically all the severer cases are suffering from an acid intoxication, and therefore any treatment to be efficient must dilute and neutralize the effects of this intoxication and favour rapid elimination. He considers that, to be of service, treatment must be given in the stages of œdema, before severe degenerative changes of the fatty type have taken place in the liver and nervous system. He uses a mixture of **Sodium Bromide, Sodium Chloride,** and **Sodium Bicarbonate** that can be given intravenously without producing the toxic effect of bromide as ordinarily given in large doses, with the addition of **Glucose,** highly concentrated, since the severe cases suffer from a starvation acidosis. Details of certain cases are given, and a table of the results in the 64 cases treated. The author states he is presenting his paper in the hope that it may stimulate others to compare the results with those obtained by the present methods.

Frank H. Carlisle,[8] in a paper on the drug treatment of *morphinism*, describes a method for rapid withdrawal of the drug. He divides it into two periods: (1) Withdrawal; and (2) Convalescence.

1. A mixture containing **Scopolamine Hydrobromide** $\frac{1}{150}$ gr. and **Morphine Hydrobromide** $\frac{1}{6}$ gr. is given hypodermically on the evening of the day of arrival, and repeated at intervals of six hours during the first twenty-four hours. On the second day the injections are given eight-hourly, and on the third day twelve-hourly. On the fourth day at bedtime the final dose is given, and also **Trional** 15 gr. During this time active purgation is given, but not violent catharsis. In individuals who fail to respond to the usual physiological effects of scopolamine, the amount is increased or decreased as required.

2. The writer lays great stress on convalescence, and urges that it must be prolonged, since for several weeks after the use of morphia ceases the patient is nervous, suffers from insomnia, lacks self-

control, and may disappear. He advises a stay of from six to twelve weeks, and says that with tonics, regular daily routine, proper diet, and exercise, the insomnia rapidly improves. The patient should attend as an out-patient for some time longer.

Charles F. Stokes,[9] in a preliminary report on the pathology and treatment of narcotic addiction, says that opium and its alkaloids and their derivatives, with few exceptions, depress nervous tissue and slow down function from the cortex to the ultimate ramifications of the vegetative nervous system, here involving the ductless glands, as shown by the disturbances in metabolism: he draws attention to the similarity between the clinical aspects of parathyroid tetany and parathyroid involvement in some cases of heroin addiction; and he asks how are withdrawal symptoms to be explained? "The clinical picture of these is that of profound fear, and is explained thus: The wave of 'counterfeit' stimulation sweeps from the cortex over the entire nervous system, and is strikingly evident in the preganglionic sympathetic fibres described by Cannon as going direct to the adrenals, there causing a sharp output of adrenin; this induces an acute sympathicotonic state, in which the autonomous side of the vegetative nervous system, the extended vagus, is inhibited (Biedl, Falta). . . . . In other words, it is deep vagus inhibition that we see, profoundly overshadowed by the sympathetic. An adequate dose of narcotic holds back adrenin, tranquillizes the condition, and the relief is immediate and complete. The fear complex may also be classed as 'counterfeit,' for there is no adequate emotional stimulus in evidence to account for the condition. The writer long ago pointed out the pathology of the manifestations in this disease that can be tranquillized by playing on the autonomous nervous system. We have seemed to avert delirium tremens in this way."

The effect of **Alcohol** on fatigue (p. 3).

REFERENCES.—[1]*N. Y. Med. Jour.* 1917, i, 629; [2]*Ibid.* 623; [3]*Med. Rec.* 1917, i, 589; [4]*Jour. Amer. Med. Assoc.* 1916, ii, 1822; [5]*Ther. Gaz.* 1916, Aug., 551; [6]*Jour. Amer. Med. Assoc.* 1916, ii, 509; [7]*Ibid.* 1826; [8]*Boston Med. and Surg. Jour.* 1917, i, 209; [9]*Med. Rec.* 1917, i, 969.

ALOPECIA.

E. Graham Little, M.D., F.R.C.P.

Gougerot[1] advises in each case a thorough survey of general causes for loss of hair, among which must be mentioned *syphilis, seborrhœa, dental neuralgia, nervous disorders, utero-ovarian, gastro-intestinal, and thyroid disease.* The general health should be improved by the use of **Cacodylate of Soda, Glycerophosphates,** sea or mountain air, gymnastic exercises, etc. **Thyroid** and **Ovarian Extract** may be given a trial. Local stimulating lotions are recommended, which should be rubbed into the scalp once or even twice a day.

Formulæ which are advised are as follows:—

(1) ℞ Liq. Formaldehydi ♏x-xxx | Tinct. Cantharid. ʒiiss
Acid. Acet. ♏xv-ʒj | Alcohol ad ʒx
Spt. Rosmarini ʒij

M. Ft. lotio.

Quinine may be substituted for the formaldehyde.

(2) ℞ Hydrarg. Perchlor. gr. x | Spt. Lavand. ℥v
Ol. Ricini ♏xx | Alcohol (90%) ad ℥xx
Acid. Acet. ♏xlv
M. Ft. lotio.

Gaucher recommends the addition to this of :—

℞ Liq. Formaldehydi ♏iij | Tinct. Cantharid. ℥ss-ij
Resorcini ℥iss | Tinct. Jaborandi ℥j-iij
Chloral. Hydrat. ℥iij-vj

Darier orders :—

(3) ℞ β-Naphthol gr. iss | Ammon. Chlor.
Hydrarg. Perchlor. gr. iij | Chloral. Hydrat. āā gr. viij
Resorcini | Spt. Lavand. ℥iiiss
M. Ft. lotio.

(4) ℞ Pilocarpin. Hydroch. gr. viij | Glycerini ℥j
'Rum' | Alcohol (80%) ad ℥iij
Spt. Camph. āā ℥iiss

Brocq adds to this :—

Tinct. Cantharid. ℥j | Ol. Gaultheriæ āā ♏iv
Ol. Santali

(5) ℞ Liq. Ammon. ℥j | Spt. Camph. ad ℥iv
Ol. Terebenth. ℥ss
M. Ft. lotio.

(6) To a tumblerful of infusion of walnut leaves add from 1 to 3 teaspoonfuls of ammonia and from 3 to 9 teaspoonfuls of rum. To this may be added, at option, 3 teaspoonfuls each of coal tar *saponiné* and spirits of camphor.

Counter-irritation.—When the state of the epidermis allows it, twice a week in the evening, or in the morning before applying the stimulating lotion, the scalp must be irritated. There are many ways of doing this : brushing with a hard brush or with a stiff-bristled T-brush ; rubbing in with a hair glove a **Spirit Lotion,** or **Acetic Acid** 1 to 3, **Chloral Hydrate** 5, and **Ether** 25 ; swabbing with tincture of **Iodine,** pure, diluted with spirit or with the addition of from 5 to 10 per cent of **Acetic Acid** ; **Carbolic Acid, Tincture of Iodine,** and spt. vini rect. (60°) equal parts, diluted, if necessary, with 3 parts of spirit ; 10 per cent of **Lactic Acid** ; irritant applications, **Blistering Fluid, Potash Soap, Chrysarobin Ointment** (7 to 10 per cent).

The skin of the scalp must be subjected to the alterative effect of ointments, lotions, or powders containing **Sulphur** from 5 to 10 per cent. The application is kept on all night.

℞ Balsam. Peru. | Sulph. Præcip. ℥j-iiss
Acid. Salicyl. | Adip. Lanæ Hydr. ad ℥iv
Resorcini āā gr. xv-xxx
M. Ft. ung.

To this may be added :—

℞ Coal Tar ℥iiss | Tinct. Cantharid. ♏xv

or

℞ Hydrochloride of Quinine and of Pilocarpine āā gr. xv

or

℞ Camph. gr. xv | Adip. ℥j
Hydrarg. Subsulph. gr. xxx
M. Ft. ung.

In the morning, the layer of ointment is removed with a swab soaked in Hofmann's liquid, and an application of the stimulating lotion is then made.

Reference.—[1]*Pract.* 1917, i, 191.

AMŒBIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

Owing to the great importance of amœbic dysentery in a number of war areas, the output of literature on the subject during the past year has been most voluminous, three papers alone totalling over three hundred pages of medical journals. Although no very remarkable new discoveries have been made, much valuable detailed work has been accomplished, especially regarding the carrier problem.

Etiology.—Great differences of opinion still exist regarding the varieties and pathogenicity of human entamœbæ. Thus Wenyon and G. Connor[1] follow the generally accepted view that *E. coli* is a harmless and *E. histolytica* a pathogenic organism, and they also describe what they believe to be a new form, *E. nana*, of frequent occurrence and small size, somewhat resembling *A. limax*, but differing from it in not being cultivable. An active amœba containing red corpuscles is always the pathogenic *E. histolytica*, but *E. coli* is difficult to recognize certainly except in the encysted stage. Four-nucleated cysts, when numerous, indicate *E. histolytica*. On the other hand, R. Knowles and A. F. Cole,[2] in Mesopotamia, began by accepting the usual points of differentiation between *E. coli* and *E. histolytica*, but found it landed them in returning cases as due to one of these organisms one day and to the other on the following day, and they concluded that only one form of human entamœba exists, which may be saprophytic at one time and become pathogenic at another. Dobell and Margaret W. Jepps[3] accept the three forms of human entamœba, including Wenyon and Connor's *E. nana*, and describe the differences between them.

Thanks to soldiers being readily kept for long under observation in hospitals after convalescence from dysentery—not often possible in the case of civilians—an immense amount of work has been done on the time the cystic stage of entamœba may remain in the bowel, and the danger of the hosts becoming the carriers of infection, considerable difference of opinion being again apparent. Thus C. Craig,[4] working in Mexico with the American forces, found amœbic dysentery to become very prevalent during August and September, when a plague of flies was also seen. He traces the infection to a number of carriers, in whose stools very numerous *E. histolytica* cysts were found. After they had been isolated, the disease decreased rapidly, which he attributes to the removal of the carriers. He also thinks that all carriers should be discharged from the Army as dangerous. Wenyon and Connor,[1] on the other hand, found in Egypt 14·8 per cent of healthy natives in gaol were carriers, and 5·3 per cent of healthy troops, and a higher number among convalescents from various diseases; they consider it impracticable to examine large numbers of

healthy men to eliminate carriers, and unnecessary to retain men in hospital after clinical recovery has taken place, even if cysts be still present in the stools. Their results showed that the carrier is almost certainly cured by a proper course of **Emetine** unless there is a history of repeated attacks of dysentery. MacAdam and R. Keelan[5] estimate that at least 33 per cent of the troops in Mesopotamia are *histolytica* carriers, and the segregation of any but the gross human carrier is an impossible and futile task. A. M. Kennedy and D. D. Rosewarne[6] met with *histolytica* carriers of from two and a half months to thirteen years' duration, but less than half had received emetine early or fully, and they consider early thorough emetine treatment, controlled by microscopical examination of the stools, as the most hopeful method of preventing the development of carriers.

Methods of detecting cysts in stools are described by A. C. Inman,[7] who uses fuchsin or iodine-glycerin for staining; R. Donaldson,[8] who advises a 5 per cent solution of potassium iodide saturated with iodine, to which is added an equal volume of a saturated solution of eosin, rubin S, or Stephens's scarlet writing fluid; and J. W. Cropper and R. W. H. Row,[9] who describe methods of concentrating and counting cysts with the aid of the centrifuge.

Inman and Lillie[10] have examined convalescent dysentery patients from France and Flanders, and found nearly 10 per cent of British and 24 per cent of Australian cases to be harbouring *histolytica* cysts, many of the latter having been previously in Gallipoli.

H. Carter, D. L. Mackinnon, J. R. Matthews, A. W. Smith, and J. W. W. Stephens,[11] in Liverpool, have made 1713 examinations of stools and examined the data statistically. They conclude that three examinations per case should discover about 60 per cent of the infections with *E. coli*, and six examinations 78 per cent, while in the case of *E. histolytica* the figures were 50 to 57 per cent and 65 per cent respectively. They also report twenty *histolytica* infections from the French front.

G. B. Bartlett[12] publishes a lengthy description of the pathology of amœbic dysentery, describing in detail the well-known naked-eye and microscopical changes, and figuring certain 'refractile cells,' which he thinks are degenerate amœbæ, and therefore of diagnostic value. He worked in Egypt on patients from Gallipoli, and found the great majority to have amœbic dysentery of a severe type, no less than 91·8 per cent of fatal cases showing this form post mortem. Pathogenic amœbæ were also found in 18 per cent of diarrhœal cases. Some cases were complicated by enteric or bacillary dysentery. In the later stages of amœbic dysentery, secondary bacterial infections may be severe and produce persistent diarrhœa, but early **Emetine** treatment lessens its occurrence. Intestinal hæmorrhage was the most frequent complication. Abscess of the liver only occurred in 5·3 per cent. This paper is well illustrated. D. Thomson and T. J. Mackie[13] also deal with dysentery in Egypt, and give advice on the prevention of the disease. M. Findlay,[14] from his Naval experience in Egypt,

found that about 90 per cent of Europeans suffer from diarrhœa on first going to Egypt, and subsequently often get dysentery. He found *E. histolytica* in 42 out of 110 such cases, and *E. minuta* in a few more, and that **Emetine** was a specific for the disease, thus preventing subsequent development of more serious dysenteric symptoms.

Treatment.—G. B. Bartlett[12] records that in Egypt, during the prevalence of a very severe type of amœbic dysentery from Gallipoli, on the advice of Sir Ronald Ross, courses of **Emetine,** totalling not less than 12 gr., were begun without the delay incurred in obtaining microscopical confirmation in all cases, and saved the forces a greatly increased mortality. In addition, **Saline Purges** and **Bismuth** were employed, the latter being especially useful for secondary bacterial infection. In cases receiving thorough emetine treatment, amœbæ were not found in the tissues post mortem; in some the lesions were healing or healed. Wenyon and O'Connor[1] also found emetine to be most effective, the best results being obtained by giving a total of 1½ gr. a day by combined injection and oral administration, although very occasionally resisting cases are met with. They point out that the cysts are harmless to the carrier, although a danger to others, as they do not produce relapses. This treatment was more effective in carrier than in acute cases, usually causing the cysts to disappear from the stools in two or three days; nor do they consider that the drug causes the entamœbæ to encyst. Relapses are rare after twelve days' treatment with 1 gr. a day by injection and ½ gr. by the mouth. Such cases should have a second course of emetine treatment, followed by small doses by the mouth, as is done with quinine in chronic malaria.

D. Thomson and T. J. Mackie[13] report that no bad effect resulted from the routine treatment of some thousands of dysentery cases with emetine in Egypt, while those ultimately proved to be bacillary also improved, and they do not consider it bad practice to administer the drug even if no entamœbæ are found. They therefore advise all cases to be treated with emetine and salines, and the stools at once sent for examination. In very severe cases, 80 c.c. of **Antidysenteric Serum** should be injected at once. By early effective treatment chronic cases will be prevented. For **Diet,** only beef tea, bovril, jelly, whey, junket, albumen-water, and Benger's food, were given in the acute stages, and after ten days milk custard, biscuits, etc. Emetine, **Salines,** and diet are the sheet-anchors in the treatment.

C. Dobell[15] reports further on the use of **Emetine Bismuth Iodide** given in 1-gr. doses in cachets three times a day until 36 gr., containing 12 gr. of emetine, had been administered. In only one case was vomiting severe. The results were very good in 11 cases, all becoming negative as regards passing cysts or amœbæ within a few days, and remaining so as long as they were examined, sometimes for considerable periods, e.g., for three weeks and upwards in 7 of them. In 3 cases in which a second course of emetine hydrochloride was given, no cure was obtained, although 2 of them cleared up under a

further course of the double emetine salt. G. C. Imrie and W. Roche[16] have also treated 6 carriers with the same salt, 5 being free of the cysts after two days and the sixth after six days, although in 4 of them emetine hydrochloride had previously failed to remove the cysts. G. C. Low[17] also reports further successful carrier cases, and also one of amœbic hepatitis, treated with the same drug, the value of which is thus being confirmed in the case of patients returning to England with chronic amœbic disease.

W. Waddell, C. Banks, H. Watson, and W. O. R. King[18] record their experience of 102 carriers treated with emetine bismuth iodide and controlled by examinations by protozoologists. They used keratin-coated tabloids, which, however, sometimes dissolved in the stomach, a 3-gr. dose being given after the mid-day meal so as not to disturb sleep as when given in the evening. Sickness and diarrhœa, sometimes with abdominal pain, resulted, and no tolerance was seen. The doses were, as a rule, continued for twelve days, and the patients were very glad to complete the course on account of the intensely irritating properties of the drug. The results, however, were generally favourable, although not so uniformly as in the smaller series of cases previously reported, the failures amounting to from 20 to 25 per cent, some after two courses of the drug. In a few cases eight or nine doses instead of twelve proved effective. To have a reasonable assurance of the success of the treatment the patients should be kept under observation for at least fourteen days after the conclusion of the course, and at least four examinations of the stools should be made during that period. The drug has no appreciable effect on intestinal flagellates.

J. W. W. Stephens and Doris L. Mackinnon[19] have tried **Alcresta Ipecac.**, a trade name for an absorption compound of ipecacuanha alkaloids with hydrated aluminium silicate. It is claimed that it passes through the stomach unchanged and produces little nausea or sickness. Five tablets were given morning and evening—equal to $1\frac{1}{2}$ gr. of emetine per day—and continued for a fortnight. Of cases followed up, 38 did not relapse after the treatment, but 14 did, at least 4 of whom cleared up under further treatment, and in 4 no effect was produced by the drug. The results may thus be better than with emetine hydrochloride, but not so good as Dobell got with emetine bismuth iodide. (*See also* p. 13.)

Cephaeline, another alkaloid of ipecacuanha, tried with approval (p. 10).

E. L. Walker and W. Emrich[20] have tried **Oil of Chenopodium** for amœbic carriers in Brazil in 14 cases, with 10 cures. A preliminary purge of $\frac{1}{2}$ to 1 oz. magnesium sulphate at 6 a.m. is followed by 16 min. of the oil of chenopodium at 8 p.m., 10 a.m., and noon, and 1 oz. of castor oil containing 50 min. of chloroform at 2 p.m. By giving the oil in capsules the disagreeable taste is avoided. Smaller doses should be given in children.

H. H. Johnson and J. A. Murphy[21] record cases illustrating the

toxicity of emetine in the form of *neuritis* often affecting the neck muscles and producing physical exhaustion, generally after over 20 gr. have been given.

A. R. Kilgore[22] records a case of peripheral neuritis following the treatment of amœbic dysentery with emetine, and has heard of several other cases, which he thinks are due to larger amounts of the drug being given than originally recommended by Rogers. [Similar cases have been reported to me after large amounts of emetine. I have never seen it after the moderate doses I use. After anything from 4 to 8 gr. have been given hypodermically, large doses of ipecacuanha, such as 20 to 30 gr., with 10 gr. of tannic acid, may be administered by the mouth every night with the usual precautions, without as a rule any sickness, and often without even nausea. The action of emetine may thus be supplemented without risk.—L. R.]

Amœbic Hepatitis.—A. I. Ludlow[23] records his experience of the open operation in 30 cases of liver abscess in Korea, with only 4 deaths. Good open drainage is necessary. He has not seen much good from emetine in these cases. Hari Nath Ghosh[24] records five cases successfully treated with Rogers's method of aspirating and injecting emetine, both into the abscess cavity at the operation and subsequently hypodermically, and thinks this plan should be adopted in all amœbic liver-abscess cases.

Urinary Amœbiasis.—J. W. S. Macfie[25] records cases of this rare condition met with in West Africa. He has now found the active amœba in the urine of 5 patients, 2 of whom could not be studied, but in the case of the other 3 *E. histolytica* were recognized.

References.—[1]*Jour. R.A.M.C.* vol. 28, 1, 151, 346, 461, 557, 686; [2]*Ind. Jour. Med. Research*, 1917, Jan. 498,; [3]*Brit. Med. Jour.* 1917, i, 607; [4]*Military Surgeon*, 1917, March and April, 286, 423; [5]*Ind. Jour. Med. Research*, 1917, July, 239; [6]*Brit. Med. Jour.* 1916, ii, 864; [7]*Lancet*, 1917, i, 990; [8]*Ibid.* 571; [9]*Ibid*, 179; [10]*Ibid.* 532; [11]*Ann. Trop. Med. and Par.* 1917, June 30, 27; [12]*Quart. Jour. Med.* 1917, April, 186; [13]*Jour. R.A.M.C.* 1917, April, 403; [14]*Lancet*, 1917, i, 755; [15]*Brit. Med. Jour.* 1916, ii, 612; [16]*Lancet*, 1917, i, 17; [17]*Ibid.* 482; [18]*Ibid.* ii, 73; [19]*Ann. Trop. Med. and Par.* 1917, Feb., 397; [20]*Jour. Amer. Med. Assoc.* 1917, ii, 1456; [21]*Military Surgeon*, 1917, March, 286; [22]*China Med. Jour.* 1917, May, 212; [23]*Ibid.* 207; [24]*Calcutta Med. Jour.* 1917, Jan., 205; [25]*Ann. Trop. Med. and Hyg.* 1916, Dec. 16, 291.

AMPUTATIONS. *W. I. de C. Wheeler, F.R.C.S.I.*

Although a considerable improvement in the design and manufacture of *artificial limbs* has been accomplished as the result of three years' war experience, there is yet much to be accomplished before the ideal is reached. The loss of an arm remains irreparable from a utilitarian point of view, especially as regards above-elbow amputations. Given a favourable stump, artificial legs are an admirable substitute, but the production has been of necessity slow, and the supply unable to meet the demand. The desideratum is a standardized limb, so that it may be possible for a man to obtain spare parts in whatever part of the country he resides. The rate of production would be enormously increased, and the expense correspondingly less.

Openshaw[1] discusses amputations from the artificial-limb point of view. He points out that one finger or the thumb of the natural hand is more useful than any apparatus. Amputation of the wrist-joint gives too long a stump for the application of an artificial hand: power is lost by the hand being too far away from the elbow. It is better to amputate above the condyle of the humerus than just below the elbow-joint, when only a couple of inches of ulna can be left.

As regards the lower extremity, a guillotine amputation through the centre of the tarsus should be looked upon as a temporary measure, and be replaced later by a Syme's amputation. In both subastragaloid and Pirogoff amputations the leg is pointed and the stump too long. The best amputation of the leg is four or five inches below the upper edge of the tibia, the fibula of course being cut from half an inch to an inch shorter. Great care must be taken from the earliest moment to prevent flexion of the knee. Even one inch of the tibia, if well covered, gives a more useful stump than amputation through or above the knee-joint. The patella should always be removed in amputation through the knee-joint, to allow more accurate fitting of the artificial limb.

In any amputation above the condyles to a point higher than the middle of the femur, the artificial leg should be made with a lacing bucket of leather—not wood. At or above the middle of the femur a re-amputation case should be fitted with a pelvic band. In the upper third of the thigh, where the bone is divided just below the small trochanter, the stump is well-nigh impossible to fit. It is far better to divide the bone still higher through the great trochanter, and it is better still to remove the upper end of the femur entirely. The Dublin leg, as made by Messrs. Smith & Shepherd, is always provided with an adjustable leather bucket in preference to the wooden socket of other makers. There is much to be said for an adjustable socket. (1) It will grip the stump with any desired degree of pressure at the time it is applied or when the stump shrinks. (2) The grip is always under the control of the wearer. (3) The flesh is not pushed up off the end of the stump, forming a pillow round the top of the socket which prevents the latter bearing on the proper points. (4) There is no unnecessary thickness round the stump, and a patient can sit with more comfort. (5) A badly-shaped stump can be moulded and brought into a more cylindrical shape. (6) In badly-covered stumps the muscular coverings can be packed down, and the socket tightened from above downwards. (7) Shoulder straps are not usually necessary, and the shoulder lift when walking is absent.

Some interesting general principles were laid down by the inter-allied Surgical Conference held in Paris in March and May, 1917;—

Amputations of the Lower Extremity.—(1) Disarticulation of the hip-joint is a more serious operation than amputation through the neck of the femur, even when performed by a racquet incision and with preliminary ligature of the vessels. (2) For satisfactory fitting of an artificial limb, an amputation through the thigh should leave a stump

extending 12 to 14 cm. below the great trochanter. (3) Amputations through the upper fourth of the thigh are difficult to accommodate with an apparatus, in consequence of the abduction of the femur which takes place. (4) Amputations through the middle and lower thirds of the thigh give good results. The great sciatic nerve should be divided above the level of the flaps. (5) Gritti's method is only suitable in late amputations. (6) Disarticulation of the knee-joint is a useful provisional procedure. (7) Amputation through the tuberosities of the tibia gives a good result, as the patient can wear an apparatus fitted to the flexed knee. (8) Amputations of the leg should be performed at the lowest practicable level. A posterior flap appears to be preferable. The fibula should be cut an inch shorter than the tibia. (9) Tibio-tarsal disarticulation with removal of the malleoli, subastragaloid amputation, Lisfranc, Syme, and Pirogoff, all give excellent results. (10) Chopart's method is only suitable for secondary or late amputations. (11) Any resection of the bones of the foot which ensures a perfect sole and preserves the normal axis of the leg should be preferred to any amputation.

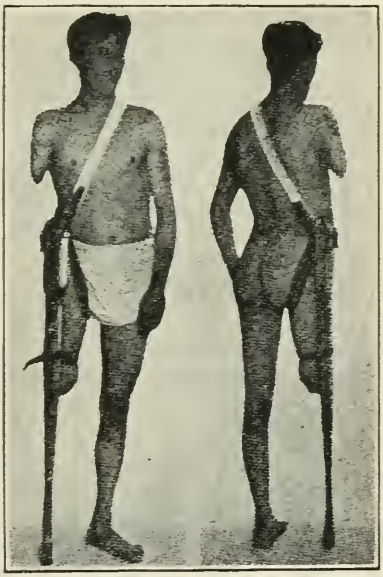

Fig. 8.—Von Baeyer's 'crutch-limb.'

Amputations of the Upper Extremity.—(1) In amputations at the shoulder, the head of the humerus should be preserved if possible. (2) Amputation of the arm should be performed at as low a level as is practicable. Either the circular or the flap method may be employed; 10 cm. of the humerus are necessary for a useful stump. (3) In the forearm every effort should be made to preserve a lever at least 10 cm. in length below the elbow-joint, and to maintain the movements of pronation and supination. (4) In the hand, whenever possible, trimming operations should be adopted, since every segment which can be preserved may prove of great service. (5) Movements of the joints above an amputation, and attention to nutrition and mobility of the muscles, should be maintained during the whole course of cicatrization. (6) The application of artificial limbs should be prompt, and a provisional apparatus should always be insisted upon, especially in the case of the lower limb. (7) The 'cinematic method' may sometimes be indicated in amputations of the arm and forearm.

From his experience as consulting surgeon to an army corps, Professor v. Baeyer (Ettlingen)[2] has evolved a very simple form of prosthesis for amputations of the leg, which may be regarded as something between a crutch and an artificial limb. He calls it a 'seat-stick,' but probably the compound word '*crutch-limb*' will suggest the device better to the English reader. The crutch-limb consists of a stick expanding above into a flat board, to the top of which two girdles are attached—pelvic and shoulder—both of adjustable length. *Fig.* 8 (p. 87) sufficiently shows its method of application. The device leaves both hands free, and avoids the necessity of axillary support, with its dangers of nerve compression. Von Baeyer states that the crutch-limb has become highly popular in his hospital.

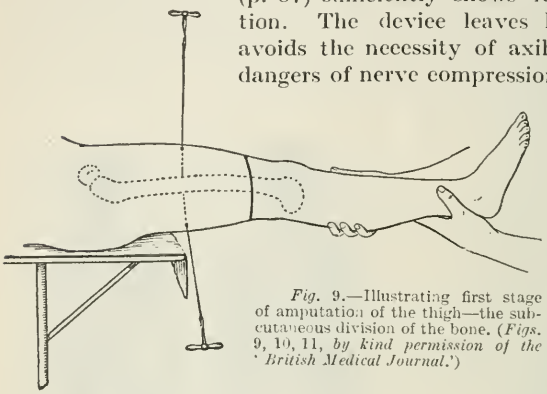

Fig. 9.—Illustrating first stage of amputation of the thigh—the subcutaneous division of the bone. (*Figs.* 9, 10, 11, *by kind permission of the 'British Medical Journal.'*)

Sampson Handley[3] describes a method of *flapless amputation* with subcutaneous division of the bone at a higher level. Two punctures are made about 4 in. above the end of the stump; a curved forceps is passed through one puncture, keeping close to the bone until it reaches the second puncture on the opposite side. A Gigli saw is grasped by the forceps, and when pulled through is made to divide the bone. The bone can then be removed by traction and division of muscular attachments via the granulating surface of the stump (*Figs.* 9, 10, 11). This is probably the best method of re-amputation after the guillotine operation.

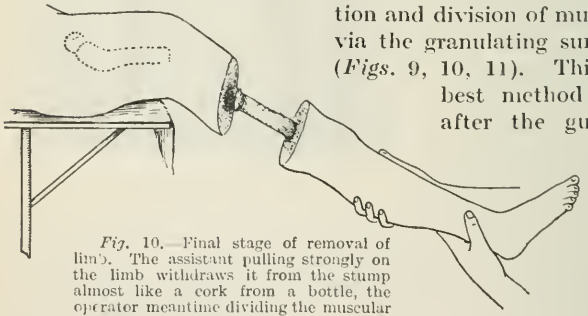

Fig. 10.—Final stage of removal of limb. The assistant pulling strongly on the limb withdraws it from the stump almost like a cork from a bottle, the operator meantime dividing the muscular attachments to the bone.

[The writer employed this method in civil practice some years ago in a bad compound fracture of the lower third of the femur in which the leg became gangrenous. A guillotine amputation was performed through the knee-joint almost at the upper level of the gangrene. The broken end of the femur was then extracted by traction and a few touches of the knife. In this case the vessels were thrombosed and no ligatures were applied. After removal of the bone, no sutures were introduced, and the patient made a rapid recovery, with a long useful stump.—W. I. de C. W.]

HOLLOW PEGS FOR USE AFTER LEG AMPUTATION

Lyle[4] makes an interesting contribution to the subject of the *aperiosteal stump* and its care. Most surgeons are now agreed that it is far better not to cover the end of a bone with periosteal flaps. Lyle recommends the removal of a small cuff of periosteum, taking care to leave no shreds behind. He recommends further that the stump should be massaged twice daily, and that at the foot of the bed should be placed a box on which the patient presses the stump at less frequent intervals every day. He advocates the early use of a peg leg.

W. A. Chapple[5] describes *hollow pegs* used by the limbless soldiers at the Pavilion Military Hospital, Brighton. They are made of the fibre-board of which light handbags and portmanteaux are made (*Plate VI*). The one for a below-knee amputation weighs 19 oz., and the one for a thigh amputation weighs 2 lb. 4½ oz. The cost of

Fig. 11.—Guillotine amputation of the thigh. Secondary amputation by the Gigli saw method. The stump nearly healed. The depressed cicatrices of the Gigli saw punctures are well shown. The stump is soundly healed with very little retraction. From a case under the author's care at the 3rd London General Hospital, Wandsworth. Drawing by Private E. Martin, R.A.M.C.

material used in the smaller one is 2s. 7½d., and of the larger 4s. The below-the-knee peg is so light that it can be put on as a slipper may be put on, and used without being fixed by the tapes. Though it is light and inexpensive it is very tough and strong, and patients have walked many miles on it. Being hollow, these pegs may be used before complete healing has taken place, and certainly long before the stump has shrunk sufficiently to justify the fitting of a permanent limb. Their use helps the shrinking during the waiting period, and hardens the skin over the 'bearing' points in preparation for the permanent limb. Patients who have worn this hollow peg have 'walked right away' without any training, when their new limb has been made. After the permanent limb is in use these hollow pegs are useful in the home when the heavy permanent limb is put off; or at night, or at other times, when a man must rise from his bed.

REFERENCES.—[1]*Lancet*, 1917, i, 905; [2]*Münch. méd. Woch.* 1917, i, 829 (abstr. *Lancet*); [3]*Brit. Med. Jour.* 1917, ii, 24; [4]*Ann. Surg.* 1916, June, 674; [5]*Lancet*, 1917, ii, 204.

ANÆMIA, PERNICIOUS. *Herbert French, M.D., F.R.C.P.*

Although the treatment of pernicious anæmia by **Splenectomy** seemed, from the earlier cases in which this course was adopted, to promise better results than does purely medicinal treatment, this promise has not been fulfilled in the experience of most observers. Percy[1] discusses the surgical treatment at considerable length; but although he advocates splenectomy as the most certain means of ameliorating rapidly the actual anæmia, he cannot claim any lasting benefit for the operation. **Transfusion of Blood** is the other surgical measure advocated in the treatment of the disease, and its employment results in marked temporary improvement in the great majority of cases; but in all up to the present, relapse has occurred afterwards with as much certainty as when treatment by **Arsenic** or **Salvarsan** without operation has been relied on. Even transfusion of blood together with splenectomy have so far failed to bring about more than temporary benefit.

Larrabee[2] is in favour of **Transfusion** as an assistance to the benefits afforded by arsenic, but his records of eight cases so treated do not convince one that they really benefited from the supply of blood from without. If transfusion is resorted to, Larrabee says that the blood should be transmitted by means of Kimpton's tubes, and not directly from arm to arm. He has found the latter method to be attended by grave risks both to donor and to recipient, whereas, using Kimpton's tubes, the operation is easy and free from danger. He adds a very useful therapeutic hint when he advises the administration of **Hydrochloric Acid** and other aids to gastric digestion, in addition to the arsenic, which he regards as essential.

McClure,[3] on the other hand, ranges himself on the side of those who believe in both splenectomy and blood transfusion, and he insists that failures have been due to the transfusions not having been repeated often enough. He advocates repeated transfusions up to as many as fourteen.

Krumbhaar[4] is in favour of **Splenectomy** for certain cases, but recognizes that the treatment is but palliative. He publishes an able summary of the late results in 153 cases so treated, and his paper should be consulted by those interested. His conclusions are :—

1. Of the 153 patients studied, 19·6 per cent died within six weeks; a distinct improvement in the clinical condition and in the blood picture occurred in 64·7 per cent, and no improvement in 15·7 per cent.

2. The rather high post-operative mortality (practically 20 per cent) may be due to poor choice of cases in the early series. As a much greater proportion of the more recent cases has survived the operation, the true post-operative mortality is probably much less.

3. Of the individuals who showed improvement shortly after operation, nearly two-thirds of the total, a large number have failed to maintain this improvement, or have since died.

4. Although a few have continued in good condition during the

period of observation (over two years), in no case can it be said that a cure has been effected.

5. On account of the improvement that follows splenectomy, it would appear to be not only a justifiable, but in many cases an advisable, procedure; but in no case should a cure be promised or the operation undertaken except under most favourable conditions.

6. The best results are obtained if the operation is preceded by one or more transfusions, and those patients who relapse after operation may still be greatly helped by transfusion. Whether or not transfusions would have produced equally good results in the absence of splenectomy is a question that cannot at present be decided.

7. The most favourable results may be expected in individuals who have not passed the fifth decade, in whom the disease has not progressed for more than a year, and who have a relatively good blood picture (that is, an anæmia that is not of too extreme a degree or of the steady, progressive type). Individuals with enlarged spleens have done better than those in whom the spleen was small or of abnormal size, as have also those suffering from an anæmia characterized by excessive hæmolysis.

8. The opposite of these conditions may be considered unfavourable factors, as should also the existence of spinal-cord symptoms or the presence of an apastic bone-marrow.

When, however, one comes to analyze all his cases, one finds that the results are by no means always favourable.

H. Z. Giffin[5] summarizes his conclusions regarding **Splenectomy** and **Transfusion** as follows: (1) There is no evidence that splenectomy has cured pernicious anæmia; (2) A review of 31 cases of splenectomy for pernicious anæmia demonstrates a definite gain in the blood, the weight, and also in the general condition during the first three months of the post-operative period in 78 per cent of the cases; during the second three months' period, 68 per cent of living patients maintained their gain; (3) A consideration of the advisability of splenectomy would seem to be warranted at present chiefly in young and middle-aged patients of good general resistance, who show evidence of active hæmolysis and in whom the spleen is moderately enlarged; (4) Preoperative treatment, especially transfusions, should be employed to influence the general condition of the patients and to improve the characteristics of the blood picture. The operative risk is increased when the hæmoglobin is below 35 per cent, and the erythrocyte count less than 1,500,000 cells; (5) Post-operative transfusions have not been given as a routine procedure, but transfusions have been successfully employed in post-operative relapse.

Of the 31 cases, 3 died as the result of splenectomy.

References.—[1]*Surg. Gyn. and Obst.* 1917, i, 533; [2]*Boston Med. and Surg. Jour.* 1917, i, 553; [3]*Jour. Amer. Med. Assoc.* 1916, ii, 793; [4]*Ibid.* 723; [5]*Ibid.* 1917, i, 429.

ANÆMIA OF INFANTS. (*See also* Splenic Anæmia.)

Chlorine Water recommended in certain cases (p. 12).

ANÆSTHETICS.

J. Blomfield, M.D.

Military experience with anæsthetics, both at the front and in base hospitals, is now reaching the stage of crystallization, and we are able to derive definite opinions from the writings of those who are busy giving anæsthetics in military hospitals. At the front the wounded divide themselves,[1] from the anæsthetist's point of view, into three classes: (1) The lightly wounded; (2) Those suffering from serious wounds with more or less shock and hæmorrhage, the two factors being commonly associated; (3) Those suffering from a severe degree of sepsis, especially anaerobic infection. The choice of anæsthetic varies in accordance with the class in which the case is placed, as well as with the region of the body injured. For the first class '**Gas and Oxygen**' is recommended as first choice. More important is the selection of the anæsthetic in the case of the seriously wounded. Here, where the reduction of shock is of the highest import, **Spinal Analgesia** has been found disappointing. For the man who has lost blood and whose wounds are recent—less than forty hours old—spinal anæsthesia is dangerous. **Ether, Gas and Oxygen**, or warmed ether vapour, have been the most successful agents. **Morphia** should be given only in small doses. If **Chloroform** be used, the patient's condition deteriorates during operation, and he does not rally afterwards.

Regarding the treatment of shock before operation, Captain G. Marshall[1] finds that **Intravenous Administration of Saline** is of little use at this stage; **Transfusion** is best done towards the end of operation. The application of **External Warmth** is the most effective detail of treatment before operation. **Hypertonic Saline** used for infusion produces more lasting elevation of blood-pressure, slowing of pulse, and dilution of blood than does the normal solution. Transfusion with blood gives better results, and much work has been done at the front to put this treatment on a safe and convenient basis.[2] In abdominal operations, besides hæmorrhage there is one factor that is sometimes responsible for rapid fall of blood-pressure; that is, turning the patient on to his side after he has been under the anæsthetic for a considerable time. Patients ill with sepsis stand amputation far better than those who are in a state of shock. In these cases, too, chloroform is to be avoided, as it is often followed by a slow fall of blood-pressure which ends fatally during the twelve hours succeeding operation.

Discussing the administration of anæsthetics to soldiers, McCardie[3] recommends the addition of chloroform to ether in a Clover's inhaler. The addition must of course be very small in amount, 1–16, or ½ dr. of **Chloroform** to 1 oz. of **Ether.** The method is suggested as a routine for induction in healthy soldiers, i.e., it is to be used under conditions just the reverse of those dealt with in the preceding paragraph. Admirable for fit, muscular young men, it would be the very reverse for the shocked, anæmic, or septic casualties near the battle line. A preliminary injection of **Morphine** or opium is regarded as part of the routine.

Two articles, one based on clinical,[4] the other on experimental, work,[5] further our knowledge of the much-debated relationship between anæsthesia and acidosis. In the former we are given an account of investigations pursued in order "to determine the degree of acidosis induced in various surgical processes; what was the difference, if any, between the various anæsthetics in this respect, and what symptoms, if any, might be attributed to acidosis." To this end observations were made on the blood of 120 patients, along with their acetone and diacetic-acid excretion during the periods of the preparation, operation, and recovery. For a description of the method used to determine the alkalinity of the blood, readers are referred to the original article.[4] Normal individuals have a carbon-dioxide tension in the alveoli of the lung of 40 mm. or more. The respiratory centre is stimulated by a decreased alkaline reserve in the blood; and such decrease is *pari passu* with decreased CO_2 tension in the alveoli. The most characteristic early symptoms of acidosis in hyperpnœa—drowsiness, headache, vomiting, and acetone smell in the breath—have been observed with readings of 25 to 20 mm. CO_2 tension. A real acidosis may be present without hyperpnœa with a tension of 30 to 25 mm., provided that level is maintained or gradually raised; but if the alkaline reserve be diminishing, then hyperpnœa is nearly always present. It is well known that fasting produces a diminution in the alkaline reserve. Crile[5] finds that both ether and nitrous oxide produce immediate increase in the hydrogen-ion concentration of the blood, i.e., diminished alkalinity of the blood during anæsthesia, and this acidity is neutralized in an animal thirty minutes after recovery. Fasting checks the acid-neutralizing power of the liver. Morphine before operation lessens acidosis, but, after it, it prolongs the period of neutralization, and in large doses prevents it.

The main conclusions arrived at clinically were: (1) There is diminution of alkalinity in the twenty-four hours before operation, probably due to fasting plus purgation. (2) There is further diminution during anæsthesia of forty-four to fifty-eight minutes. (3) The diminished alkaline reserve is compensated for largely in the first twenty-four hours after operation, the compensation being less after chloroform. (4) Operations under local as well as under general anæsthetics show diminution of alkaline reserve. (5) There is only negligible difference between the various types of anæsthesia as to the degree of diminution, but after chloroform there is delay in the return to normal. (6) By the administration of sodium bicarbonate the normal alkaline reserve may be so increased that the usual diminution in the twenty-four hours preceding operation may be obviated. Furthermore it reduces the rate of diminution during the anæsthetic by one-half. In such cases the post-operative compensation is not witnessed. (7) Nausea, vomiting, and headache are not affected by this treatment. No constant relation was found between the blood, carbon-dioxide, and acetone and diacetic acid in the urine. The latter, moreover, appeared to be independent of the length or gravity

of operation. Sex appears to play some part, the percentage of women showing acetone and diacetic acid before and after operation being higher than that of men, and the amounts shown almost invariably greater. The author[4] concludes by maintaining that none of the symptoms observed in the routine post-operative course are due to diminished alkalinity induced by preparation, anæsthesia, and operation ; that acetone and diacetic acid occur in the urine of a number of patients before, and in increased percentage and amounts after, operation ; and that the choice of anæsthetics, so far as acidosis is concerned, is irrelevant. Thus the position seems to be, according to Caldwell, that although anæsthetics and operation may, and generally do, cause an increase in the hydrogen-ion concentration of the blood and a diminution of the reserve alkalinity, yet the symptoms—headache, vomiting, etc.—do not depend upon the acidosis ; in Crile's opinion, however, they do.[5]

For further information on anæsthesia and acidosis the reader should see an article by W. H. Morriss.[6]

The value of **Heart Massage** in cases of prolonged failure of the circulation during anæsthesia is illustrated by a case reported by Mollison.[7] The patient was a boy of six who had the operation for removal of tonsils and adenoids. The author shows good reason for believing that the heart stoppage lasted fully five minutes before the abdomen was opened for attempted restoration. Altogether he thinks the heart-beats were in abeyance for at least thirteen, and perhaps as much as twenty-four, minutes. During part of this time, however, some slight circulation must have gone on, as respiratory movements started while the heart was being massaged, before it had properly resumed its beating. The boy remained more or less unconscious for seven days, and for ten days there were rigidity of the limbs and choreic movements ; also there followed incontinence of both fæces and urine and shrill 'meningitic' cries. Complete recovery took six weeks. The author gives a list of fourteen recorded cases. He points out that the difficulty in such a case is to make up one's mind that the heart will not recover without a desperate measure; it would be most unwise to lay down the rule that subdiaphragmatic massage should at once be undertaken in every case of heart failure under an anæsthetic. In the treatment of this patient 1 c.c. of **Pituitrin** was injected into the heart, and the question arises as to how great, if any, a part this played in the restoration of the heart-beat. Two other somewhat similar cases are related.[8]

Rectal Anæsthesia has been a good deal practised and described during the past year. The mixture of 50 to 75 per cent **Ether with Olive Oil** has been generally employed. Several writers point out the importance of washing out the rectum and lower colon carefully at the end of the operation, and one authority[9] attributes three deaths that followed operation to the bloody diarrhœa from which the patients suffered. In these cases the rectum had not been washed out afterwards. Although under ordinary conditions the method is

not often the most desirable of all that are available, yet its great value under special circumstances is undoubted. For reasons of economy of personnel, as well as of ether, it may well at times assume the first place.[10]

The value of **Continuous Nitrous Oxide and Oxygen** in major surgery continues to arouse contentious opinions. We find one authority[11] describing it as the most dangerous anæsthetic, and producing a list of fatalities which he puts to its discredit, while another[12] produces reasons to regard nitrous oxide as the safest of all agents. He shows, truly enough, that alone amongst the common anæsthetics it has no toxic properties. This author attributes fatalities that occur during prolonged nitrous-oxide anæsthesia entirely to inexperience with the method ; and it is obvious that in major surgery good results cannot be achieved with this anæsthetic except by the hands of those who have had much practice with it. Moreover there is, more than with any other anæsthetic, the necessity for co-operation on the surgeon's part ; either local anæsthetics or exceptional gentleness of manipulation are generally indispensable to success. Some contra-indications mentioned[12] are : (1) Cases of patients with high blood-pressure in whom the Trendelenburg position is to be adopted ; (2) Poorly nourished children with tonsils and adenoids ; (3) Swellings in the throat, such as Ludwig's angina.

Under the title *narco-anæsthesia* is described[13] a method of obtaining surgical anæsthesia by repeated injections of **Scopolamine.** Three doses of $\frac{1}{150}$ gr. are given at intervals of three, two and a half, and one and a half hours before operation.

Anæsthesia by **Intravenous Injection of Magnesium Sulphate** has been experimented with by Peck and Meltzer.[14] They prove its possibility, but do not claim it as a method to be introduced into practice yet. From extensive experience in the use of magnesium sulphate in the treatment of tetanus they conclude that human beings are more susceptible than animals to the effects of the salt. It has been contended that although in animals immobility may be secured by injection, yet there was no real anæsthesia—only motor paralysis. This contention is upset, at any rate in the case of human beings, by the true anæsthesia induced by these authors in at least two of the three cases related.

The extended use of **Ethyl Chloride** in military surgery is advocated by Boureau.[15] He speaks from an experience of 2000 cases, and is convinced of the suitability of ethyl chloride for operations taking even an hour and three-quarters. He employs an open method only, using a fairly thick pad of gauze, or even an ordinary handkerchief, as mask. On this he squirts at first 2 or 3 c.c. of pure ethyl chloride, admixture of air being free. After a minute the pad is kept more closely to the face, and 1 c.c. is added per minute. In war surgery there were many cases well adapted to this method—the majority of operations on limbs and for the extraction of foreign bodies, for instance. For abdominal surgery it would probably be very unsuit-

able, and the author gives no case of its use in this department of practice. He mentions that, owing to the volatility of ethyl chloride, the drug is far more quickly got rid of after even a long inhalation than are ether and chloroform, and that the reduction in unpleasant after-effects is in proportion.

In an article on *routine spinal analgesia*,[16] the authors deal with details of over 6000 cases. A large number of the patients were West Indian negroes and Panamanians, and these were found to be better suited than Europeans to the method. In only one case was death attributed solely to the anæsthetic. In another case the patient gave a cough and collapsed after the puncture had been made but before any stovaine had been injected. In 479 cases in the hands of six different administrators there were 6·25 per cent failures. The conclusion arrived at is that there is a restricted field in which spinal analgesia is as safe and efficient as any general anæsthetic, and a wider field in which it can be used if general anæsthesia is contra-indicated. Another writer[17] lays stress on the uncertainty of the method, as well as on the perfection of the result in successful cases.

The success of experiments to produce **Colloidal Cocaine**[18] may well be the forerunner of a considerable revolution in the practice of *local analgesia*. The drug is so little toxic that 1915 c.c. of a 1 per cent solution were injected intravenously without producing symptoms in a rabbit.[19]

Petridis,[20] in a well-illustrated article, records his experience with a solution consisting of **Novocain** 1 gr. and **Physiological Serum** 200 c.c.; this serum was made of 9 gr. sodium chloride to 1000 c.c. distilled water, and to this solution adrenalin 1–1000 was added. The novocain solution was used fresh, i.e., not more than four days old. Morphia and oil of camphor were given a quarter of an hour before operation. In thirteen appendix cases, ten patients required some chloroform. Cases of hæmorrhoids provided the largest proportion of complete success. The superiority of novocain with adrenalin to all other local anæsthetics is claimed by another writer;[21] he has injected as much as 240 min. of a 1 per cent solution without harm.

See **Apothesine** (p. 4) and **Stovaine** (p. 28).

References.—[1]*Brit. Med. Jour.* 1917, i, 722; [2]*Ibid.* 1917, ii, 679; [3]*Ibid.* i, 508; [4]*Surg. Gyn. and Obst.* 1917, ii, 22; [5]*Jour. Amer. Med. Assoc.* 1916, ii, 1830; [6]*Ibid.* 1917, i, 1391; [7]*Brit. Jour. Child. Dis.* 1917, Jan.-March, 42; [8]*Ibid.* March, 419; [9]*Surg. Gyn. and Obst.* 1917, i, 370; [10]*S. Afric. Med. Rec.* 1916, Sept. 260; [11]*Med. Rec.* 1916, ii, 45; [12]*Ibid.* 1917, i, 63; [13]*N. Y. Med. Jour.* 1917, i, 61; [14]*Jour. Amer. Med. Assoc.* 1916, ii, 1131; [15]*Presse Méd.* 1917, May 21, 296; [16]*Jour. Amer. Med. Assoc.* 1917, i, 601; [17]*Lyon Chir.* 1917, May to June, 479; [18]*Lancet*, 1917, i, 660; [19]*Ibid.* 769; [20]*Lyon Chir.* 1916, Dec., 912; [21]*Ann. Surg.* 1916, ii, 589.

ANAPHYLAXIS AND PROTEIN EXTRACTS.

Herbert French, M.D., F.R.C.P.

We are all familiar with the undue sensitiveness—'anaphylaxis'—certain individuals exhibit towards particular protein substances, well known examples being the extreme urticaria caused by strawberries

in a patient here and there, similar effects of crab in others, or the production of hay-fever coryza in those who are unduly sensitive to the proteins of certain grass-pollens. It is most unlikely that similar but less obvious anaphylaxis to numbers of other substances does not exist; and this idea opens up a vista of much work that has still to be done by the medical profession in discovering the anaphylactic peculiarities of many individuals who suffer from gastro-intestinal, bronchial, or other symptoms which often seem to have no cause, or even appear to be purely neurotic, when really they may have a preventable basis. Bronchial asthma suggests itself as a malady in which, were one to know the individual's anaphylactic peculiarities to different food-stuffs, and to the products of various micro-organisms—which need not necessarily be pathogenic germs in the general sense—one might do much more to relieve the patient than one can at present. The idea is not a new one; anaphylaxis (undue sensitiveness to a particular protein) underlies such tests as von Pirquet's and Calmette's tuberculin reactions; but the extent to which the idea may be applicable in practical medicine is not appreciated widely at present. Harvard Medical School is a centre from which a start is being made in investigating the subject, and although the laboratory work there has not yet led to publications which are directly applicable by a practising physician or surgeon, the underlying idea is one well worthy of careful thought by every doctor. For example, Baker and Floyd,[1] having prepared a large number of different animal and vegetable protein extracts, have been testing them seriatim by skin inoculation in cases of bronchial asthma, to find out which give positive and which negative reactions; in other words, to find out to which proteins the individual is hypersensitive.

The test is carried out in a similar way to the von Pirquet tuberculin test. The inner side of the forearm is cleaned with alcohol and ether, and two scarifications or similar scratches are made about three inches apart, allowing the oozing of serum only. On one spot or scratch one or two drops of the extract are placed and allowed to soak in. The other spot is kept as a control. Both spots should be examined at intervals of twenty minutes, half an hour, and one hour. In many cases the food extracts give quicker reactions than the bacterial extracts. Positive reactions consist of a raised urticarial wheal, surrounded by an area of redness of the skin, somewhat circular in outline and usually from 2 to 7 mm. in diameter.

It seems not at all unlikely that useful therapeutic discoveries will be made ultimately through work done in this direction, especially when suitable protein extracts are available for applying the tests in practice.

REFERENCE.—[1] "Protein Extracts in States of Hypersensitization," *Boston Med. and Surg. Jour.* 1916, ii, 199.

ANENCEPHALY.

Successful diagnosis before birth by **X Rays** (p. 47).

ANEURYSM, AORTIC. *C. F. Coombs, M.D., F.R.C.P.*

Poggio[1] describes three cases of aortic aneurysm treated by **Iodo-gelatin** (Selavo) given by mouth or by intramuscular injection. This is held to (1) lower arterial tension by virtue of introducing iodine into the body in a non-toxic form, (2) promote coagulation in the aneurysmal sac by virtue of the thrombotic action of gelatin. The daily dose injected was 2 c.c. repeated till thirty doses had been given. After a suitable rest a second course may be given. Poggio claims good results from this treatment, which can be used as supplementary to the usual scheme of rest with restriction of fluids.

Reference.—[1]*Policlinico (Sez. Prat.)*, 1916, 1180.

ANGIOMATA.

Employment of **Quinine** and **Urea Hydrochloride** in (p. 25).

ANGIONEUROTIC ŒDEMA. *Herbert French, M.D., F.R.C.P.*

The medicinal treatment of angioneurotic œdema has generally proved unsuccessful ; but one should not be surprised, perhaps, if the administration of one or other of the internal glandular secretions benefited at least some of the patients. It is of interest, therefore, that Dryland[1] records two cases of severe and recurrent angioneurotic œdema, in each of whom treatment by **Thyroid Extract,** gr. ½, three times a day, succeeded in keeping the attacks in check when other measures had failed. Codd,[2] on the other hand, found injections of **Adrenalin** were very efficient in aborting the actual attacks which afflicted a patient of his. In the earlier part of the treatment she had, internally, calcium lactate, sodium salicylate, and nitroglycerin ; and externally, Lassar's paste, lotio calaminæ, lotio plumbi, resinol, and many other remedies, but without any obvious effect. Then he tried adrenalin injections, giving 4 min. of solutions of adrenalin chloride or **Epinine.** The immediate effect was rather remarkable. The insertion of the needle was particularly painful ; the patient then felt she was 'going lifeless,' a sensation almost like one of impending death ; she was intensely anxious, and dared not move, but lay quite horizontal. She had a numb feeling, beginning at the toes and gradually spreading up the body, with a sensation of being blanched. At this time there was definite pallor, which increased, and the pulse distinctly waned and became flickering. There was a zone of pallor round the injection, and always a black stain at the site of puncture. The unpleasant apprehensive feeling speedily passed off, and she felt quite well again. If the rash were fully out, it took several hours to disappear, but when given in the first stage of numbness and itching the injection would abort the attack at once. After a few injections and observation of the specific effect, he gave her **Suprarenal Tablets** three times a day. At first the attacks were diminished in frequency and severity, and eventually they ceased.

Giddiness in Angioneurotic Cases.—Dryland[3] calls attention to severe though transitory attacks of giddiness that may occur in patients who

are subject to angioneurotic œdema. The attacks are not necessarily associated with actual œdema bouts at the same time : rather are they alternative phenomena. He describes two cases that he has watched closely in private practice. Both suffer from recurrent attacks of giddiness coming on nearly always after fatigue or emotion. The patient has time to lie down, and then becomes unconscious. Neither has any demonstrable heart lesion. These fits are not ordinary faints, and they have none of the usual characteristics of hysteria. They are accompanied by a feeling of fullness, and in one case by pain in the top of the head, and the pulse becomes slowed. Return to consciousness is accompanied and succeeded by a profound sensation of pins and needles, particularly in the fingers and toes. These two cases suggest that other cases of recurrent giddiness of obscure origin may be due to cerebral neurovascular changes, allied to angioneurotic œdema, Raynaud's disease, and so on ; and in view of Dryland's favourable experience of the benefits of **Thyroid Extract** in small doses in angioneurotic œdema, it may be well worth trying this remedy in cases of Ménière's disease. The dose Dryland found most beneficial was ½ gr., three times a day ; and in his two cases these small doses not only checked the bouts of angioneurotic œdema, but also stopped the severe attacks of giddiness altogether.

References.—[1]*Med. Press and Circ.* 1917, Aug., 101 ; [2]*Brit. Med. Jour.* 1917, i, 808 ; [3]*Med. Press and Circ.* 1917, Aug., 101.

ANKYLOSTOMIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

The efforts of the Rockefeller Sanitary Commission to deal with the scourge of ankylostomiasis is clearly reflected in the literature of the past year on the subject, inquiries in China, India, etc., having been inspired and largely financed by them. E. H. Hume[1] deals with a preliminary study of the problem in the Hunan province of Central China. He points out the great difficulties involved in the necessity for using human excrement for fertilizing the soil, and the importance of solving the problem of destroying the ova in it before it is distributed over the land. The most striking fact emerging from his inquiry is the great prevalence of the disease among workers in deep hot mines (81·6 per cent) and in farmers (56·41 per cent). In three non-mining districts the average incidence in all classes was 14·4 per cent, which is far lower than in India. At the present time further surveys and educational measures are most required. K. S. Mhaskar,[2] working in the Madras Presidency at the port of Negapatam, found hookworm infection in no less than 98·6 per cent of the healthy emigrants, and a similar rate in two villages of the Tangore district, while the town showed 91 per cent. The physical condition of the infected coolies was good, but infected school-children showed bad physique, anæmia, and much ill-health. C. Lane[3] has found 66 per cent of infections in the tea gardens in the Darjeeling district, and he now records favourable opinions of a number of planters regarding the good effect of an extensive campaign for the removal of the infection.

W. Yorke and B. Blacklock[4] discuss criticisms of their description of *Ankylostoma ceylanicum* found in West African dogs.

W. C. Billings and J. P. Hickey,[5] after giving an illustrated account of the ordinary methods of finding ankylostoma ova in stools, record their experience of the treatment of the disease with **Oil of Chenopodium**, with which they obtained 87 per cent of successes with one treatment and 100 per cent with two treatments, against 74 per cent and 88 per cent respectively with thymol. The former drug also gave rise to much less disagreeable symptoms, and required less preliminary treatment. The eucalyptol-chloroform-castor-oil mixture was far inferior to either oil of chenopodium or thymol, while betanaphthol also gave unsatisfactory results. They advise doses of 15 drops (approximately 6 min.) repeated three times at 7, 9, and 11 a.m., followed at 1 p.m. by 18 c.c. **Castor Oil** and 2 c.c. **Chloroform**, and at 1.30 p.m. by 30 c.c. of plain castor oil. Maurice C. Hall and W. D. Foster[6] also recommend oil of chenopodium and castor oil and chloroform. B. E. Washburn[7] adv ses 30 to 40 gr. of **Sodium Bicarbonate** with **Thymol.**

References.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 1888; [2]*Ind. Jour. Med. Research*, 1917, April, 771; [3]*Ind. Med. Gaz.* 1917, May, 161; [4]*Ann. Trop. Med. and Par.* 1917, June, 69; [5]*Jour. Amer. Med. Assoc.* ii, 1917, 1908; [6]*Ibid.* i, 1961; [7]*Ibid.* i, 1162.

APPENDICITIS, CHRONIC. *Robert Hutchison, M.D., F.R.C.P.*

There are signs of a reaction against the rage for removing the appendix in all sorts of abdominal conditions which still persists in some quarters. Thus Verbrycke,[1] in a paper on "Chronic Appendicitis Mistakes," points out how often the appendix is removed for supposed chronic inflammation without the patient's symptoms being relieved. Amongst the conditions which may simulate chronic appendicitis, he mentions pericolic membranes, Lane's kink, mobile cæcum, dilated atonic cæcum with stasis, ileocæcal regurgitation, double-barrel colon, visceroptosis, vagotonia with its many manifestations (of which colonospasm is probably the most frequent), adherent omentum, adhesions other than Jackson's membrane, pelvic disease, trouble in the urinary apparatus, gastric and duodenal ulcer, cholecystitis, and perhaps other conditions. There is also the class of patient exhibiting tenderness in the right iliac region, though often in other places as well, who are simply below par physically and mentally. They frequently have visceroptosis, but this is not essential. They are the kind of dyspeptics, of whom we see great numbers, who symptomatically simulate various organic diseases. They go from one doctor to another, and are never cured unless by some decided change in their surroundings and mode of life, or by putting to bed with mental and physical rest, and building up by forced feeding and constant encouragement. These patients are highly susceptible to shock, and while some may be benefited by operation through suggestion, others will be harmed by it. This is the class which might be called pseudo-appendicitis.

Of the many signs which have been described as diagnostic of

chronic appendicitis, he believes the causation of reflex epigastric pain on pressure over the appendix to be the most trustworthy, but unfortunately it is not present in the majority of cases. Bastedo's sign (the production of pain at the appendix when the colon is distended with air) is valuable in differentiating disease of the adnexa when these organs are not adherent to the appendix or bowel. A positive result, however, can be obtained in disease of the cæcum. Rosenbloom,[2] on the other hand, is convinced that Bastedo's sign is of great value.

Levy[3] is of opinion that there exists a condition of *chronic typhlitis* in the strict sense which is often mistaken for chronic appendicitis. He believes it to be set up by old-standing constipation which allows bacteria to bring about a state of mild inflammation. As a result the wall of the cæcum loses tone and it becomes dilated and, later, ptosed. The symptoms are constipation with occasional attacks of diarrhœa, the usual manifestations of 'intestinal toxæmia,' and tenderness, not only over McBurney's point but extending along the lower part of the ascending colon. X-ray examination also helps in the diagnosis (p. 46). The treatment of such cases should at first be along medical lines—rest in bed, a soft, unirritating diet, mild laxatives, etc. If there is no relief after two or three weeks of such treatment, exploration may be resorted to.

References.—[1]*Med. Rec.* 1917, i, 455; [2]*Surg. Gyn. and Obst.* 1916, ii, 538; [3]*N. Y. Med. Jour.* 1917, i, 449.

[Many gouty patients suffer from periodical attacks, due to passage of thickened bile through the gall-duct. This frequently gives rise to reflex pain in the region of the appendix. Tenderness over the gall-bladder is always present during the attack. In such cases "the recurrent attacks of appendicitis" entirely cease if the patient takes the following pill three times a week: **Res. Podophyl.** gr. $\frac{1}{8}$. **Ext. Bellad.** gr. $\frac{1}{8}$.—Ed. Medical Annual.]

APPENDIX, SURGERY OF.

E. Wyllys Andrews, M.D., F.A.C.S. (Chicago).

Hewitt[1] thinks the leucocyte count is a valuable prognostic sign in acute appendicitis. The ratio of the total to the polymorphonuclear count is important. A low absolute count with a high polymorphonuclear is a grave prognostic sign. Both being low usually means no infection. Normal figures are occasionally present in gangrene or pus and catarrhal cases: rapidly fatal septic ones and walled off abscesses usually did not bring about leucocytosis. The paper is an analysis of a careful observation of 110 cases.

Reel,[2] Graves,[3] Ginsberg[4] and Dodge[5] report cases of cysts of the appendix, the latter giving the following conclusions after reviewing the literature: (1) Cystic dilatation of the appendix is a relatively infrequent condition: (2) That true hydrops of the appendix is rare: probably less than 9 per cent of all appendiceal cysts: (3) That appendix cysts are essentially retention cysts and of inflammatory origin; (4) That the condition by no means runs a symptomless

course ; symptoms being present in at least 50 per cent of operative cases, and 24 per cent of all cases ; (5) That the contents of certain appendiceal cysts, when implanted upon the peritoneal surfaee, are capable of producing a condition of pseudomyxoma peritonei ; (6) That certain cysts present structural and clinical characters that seem to ally them with adenocystomata ; (7) That carcinomatous changes occasionally take place in appendiceal cysts.

Kermisson[6] reports carcinoma of the appendix found in a girl fourteen years old. It was very small, limited to the appendix, located near the cæcal end and obstructing it Acute inflammation followed, necessitating operation. The patient was free from recurrence two years later. Wahl[7] reports a sarcoma and reviews the literature. Sarcomas of the appendix are rarer and more malignant than carcinomas. Their diagnosis even microscopically is difficult, because of their resemblance to scar and inflammatory tissue.

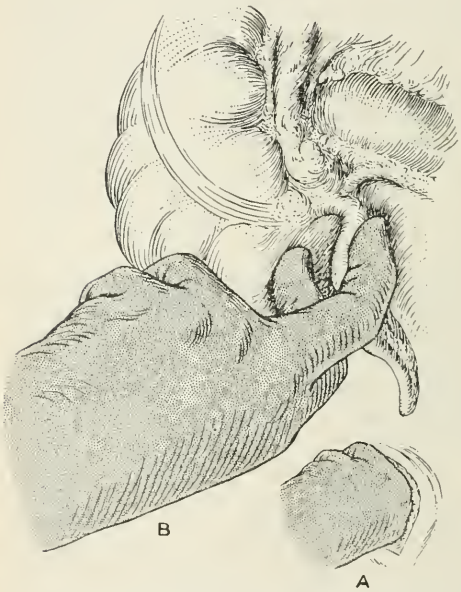

Fig. 12.—A, showing hand swept upward toward midline; B root of mesentery located and appendix grasped between fingers. (*Redrawn from* '*Annals of Surgery*.')

Nix[8] believes that, in the living, the appendix lies lower than McBurney's point, where dissections show it. Therefore, he has removed it through the inguinal canal fifty-one times, and reports very favourably on the method. He makes an incision ½ to 1 in. in length over the inguinal canal, the lower end being about 1 in. from the right pubic spine. Separate the fibres of the external oblique, but leave the ring intact. Retract the divided aponeurosis. The strong fibres of the conjoined tendon are separated as in the grid-iron technique. Retracting the divided tendon exposes a little pad of fat which protects the internal abdominal ring and separates the peritoneum from the abdominal wall at this point. By retracting upward with a small curved forceps the peritoneum is caught and divided with scissors, thereby opening the abdominal cavity. The operation is done under local anæsthesia.

Guthrie[9] urges against drawing out a large amount of descending colon or small bowel in the search for the appendix. It can be

found with much less trauma by using the root of the mesentery as a guide. "Through a muscle-splitting or McBurney's incision the index and middle fingers of the left hand are inserted into the iliac fossa. The cæcum, lying directly underneath, is lifted well up in the iliac fossa by a cat's-pawing action of the fingers, until the head is located. The fingers are then swept along the course of the iliac vessels from without inward and upward, describing an arc of one-fourth of a circle, until the point of attachment of the root of the mesentery is reached. This is felt as a band, which marks the location of the ileocæcal juncture. The base of the appendix, if lying free in the abdomen, should be within ¾ in. from this point. If the hand is now elevated slightly, anteriorly, and the fingers moved about, the appendix as a rule can be found (*Fig.* 12). Grasped between the fingers it can be delivered through the wound.

MacLaren[10] cautions against the removal of the so-called 'chronic appendix.' He says a great many of those cases which have pain in the right side, constipation, and gastric symptoms, are really due to visceroptosis, constipation, neurasthenia, and allied conditions, and appendectomy brings no relief. The author quotes eighteen such cases from his own records. Becker and Grendahl,[11] report similar poor results from appendectomy for reflex symptoms such as stasis or dyspepsia. Satterlee,[12] in a discussion of intestinal stasis, says that 25 per cent of his cases had had appendectomy done with no benefit.

References.—[1]*Ann. Surg.* 1917, lxvi, 143; [2]*Ibid.* 1917, June, 743; [3]*Ibid.* 1916, Nov. 587; [4]*Ibid.* 586; [5]*Ibid.* 1916, Mar.; [6]*Bull. et Mém. Soc. de Chir. de Paris*, 1917, xliii, 1432; [7]*Ann. Surg.* 1916, lxiv, 311; [8]*New Orleans Med. and Surg. Jour.* lxix, 709; [9]*Ann. Surg.* 1917, June, 742; [10]*Ibid.* 1916, Nov., 579; [11]*Tr. XI North Surg. Cong.* 1916, July; [12]*Amer. Jour. Med. Sci.* 1916, cli, 727.

ARGYRIA. *E. Graham Little, M.D., F.R.C.P.*

Olson[1] recommends **Hexamine** in 5- to 10-gr. doses three times daily in all cases of discoloration of the skin resulting from organic silver salts. This discoloration may be local (as in the use of argyrol and similar silver preparations in the treatment of conjunctivitis), or general from the internal administration of silver. Local applications of organic silver salts should not be given when the skin or mucous membranes are not intact.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 87.

ARTHRALGIA.

Injections of **Colloidal Sulphur** (p. 31).

ARTHRITIS DEFORMANS.

Employment of **Continuous Baths** advocated (p. 5).

ASCARIDES.

Chenopodium Oil useful (p. 10).

ASTHMA. *Arthur Latham, M.D., F.R.C.P.*

Fritz B. Talbot,[1] after an interesting study of asthma in children, concludes that a definite etiological connection may be established between most cases of asthma occurring in childhood and a foreign protein. The food responsible is discovered by the simple skin test (scarification and the use of a pure protein extracted from the food in question). When an individual is sensitive to one protein he is apt to be sensitive to others. The difficulty of finding the cause of asthma is shown by a case in which thirty-eight tests were made before positive information was obtained. In a considerable proportion of cases fresh egg-albumen was found to be the causal factor. When a positive skin test is obtained for a food, and the food is then removed from the diet, the general condition of the patient almost invariably improves, and in many instances a cure results. In other cases it is necessary to induce an artificial immunity, because of the difficulty in entirely eliminating the offending protein from the diet, as for example eggs or milk. Immunity may be induced in these patients by giving increasing doses of the protein as described by Schloss.[2] In a considerable number of cases no relation of the asthmatic attacks to any food is forthcoming, as was to be expected in view of the fact that so many cases of asthma are examples of 'dust-asthma,' and others are definitely due to bacterial infection.

M. H. Kahn and H. W. Emsheimer,[3] who have used **Autogenous Defibrinated Blood** in bronchial asthma, report six cases treated by this new method. In each case 20 to 30 c.c. of blood were withdrawn from a vein with a sterile needle, and were received in a sterile 1-oz. flask containing glass beads. The contents were agitated for from five to seven minutes to separate the fibrin, and the defibrinated blood was then drawn into a 30-c.c. syringe and immediately injected subcutaneously into the loin of the patient. Ten injections at weekly intervals were made in each case. No local or immediate general effects followed the injections. Whenever possible the blood was obtained during an asthmatic attack. The procedure is based on the idea that the asthmatic paroxysm is a spasm of the bronchioles due to anaphylaxis, the result of protein sensitization. The repeated injections of small doses of the causal protein in the patient's blood are intended to produce an active immunization. The patients treated all showed definite improvement, as indicated by diminution in the frequency and severity of the attacks, gain in weight, increased ability to work, and improved subjective symptoms.

A. G. Auld,[4] in a preliminary note on a new treatment of bronchial asthma, expresses the opinion that an asthmatic attack is a reaction on the part of the lungs to a toxic substance, either of distinctly pathological origin, or else a product of normal metabolism which gradually accumulates in the blood. He therefore set out to immunize patients, and in view of the fact that Biedl and Kraus had produced bronchial spasm in guinea-pigs after the administration of a peptone, he used Armour **Peptone** in his investigation : $\frac{1}{3}$ grm. of peptone dissolved in

about 5 c.c. distilled water at blood heat is injected at an interval of three or four days in the first week ; next week two injections each of $\frac{2}{3}$ grm. are similarly given, and in the third week two injections of 1 grm. in 7 to 10 c.c. water. He states that this procedure is often sufficient, but severe cases may require 1 grm. weekly or bi-weekly, and that in a limited number of cases in which the procedure has been tried the results have surpassed expectation.

REFERENCES.—[1]*Boston Med. and Surg. Jour.* 1916, ii, 191 ; [2]*Amer. Jour. Dis. Childr.* 1912 ; [3]*Arch. Internat. Med.* 1915, Oct. ; [4]*Brit. Med. Jour.* 1917, i, 580.

J. S. Fraser, M.B., F.R.C.S.

Brown[1] accepts the theory that asthma is due to spasm of the bronchial muscle, and that the œdema of the mucous membrane, which undoubtedly exists, is only secondary. The bronchial spasm has been attributed (1) to reflex irritation, and (2) to the introduction of a foreign proteid to which a sensitization has been produced. Neurotic disturbance of the higher centres may interfere with the inhibition of reflex action in asthmatics. (Brown's cases were nearly all of the neurotic type.)

1. The reflex theory implies that attacks are brought about by an irritant in the nose or some other part.

2. The anaphylactic theory. Experiments have shown that the injection of foreign proteid produces a sensitization of the body to that particular proteid, and that a subsequent injection of the same proteid produces the symptom-complex of anaphylactic shock, which has many characteristics of an asthmatic attack. It is not known whether the attacks are due to the toxin in the blood acting on the bronchial muscle directly, or through the nervous system. Auer and Lewis obtained the same results in pithed as in unpithed animals, and also after section of the vagi. Matthews believes that the bronchial spasm is caused by direct stimulation of the bronchial muscle through the blood. In asthma due to pathological lesions in the nose, the absorption of pus or muco-pus from these lesions is regarded as the cause of the attacks. Koesler and Moodie believe that bronchial asthma is due to a focal infection in the bronchi themselves.

In all of Brown's 27 cases there was some involvement of the ethmoids, though only 5 cases were suppurative. Brown, of course, recognizes that many patients have noses full of polypi without any asthmatic symptoms, and he therefore regards a neurotic tendency as the underlying factor in his cases. Many of his patients had gone through the list of asthma remedies with only temporary relief. In age the patients varied from four to sixty-two years. The maxillary antrum was involved in 3 cases, frontal sinus in 2, and the sphenoid in 2. The ethmoids were affected in every case. The treatment consisted in an exenteration of the ethmoid as nearly complete as possible according to Mosher's method. The septum was only operated on when needed. The maxillary, frontal, and sphenoid sinuses were treated by intranasal methods when affected. Brown reports

that 6 of his cases were completely relieved, 12 decidedly improved, 7 slightly improved, and 2 not improved. He realizes the great difficulty of doing a complete exenteration.

Zueblin[2] states that **Pituitrin** administered in appropriate doses (1 c.c.) may remove the cardiovascular depression, and in some instances cure, or at least alleviate, the clinical symptoms of asthma.

Syme[3] has treated eight cases of asthma by the direct application of 10 per cent **Silver Nitrate** solution to the lining of the bronchi with the aid of the bronchoscope. The idea underlying the treatment is, that in asthma one factor in the causation is an exaggeration of a normal reflex. The silver nitrate is applied with the hope of weakening this reflex, because it leaves a coating of silver chloride or albuminate over the sensitive surfaces. Syme's patients varied in age from ten to fifty-three years, and in all, except the youngest, treatment was conducted under **Cocaine** anæsthesia, with a preliminary hypodermic injection of **Omnopon** or **Morphia** and **Atropine.** The bronchoscope was introduced with the patient in the left lateral position, and a mixture of cocaine and adrenalin applied to the mucous membrane as far as the openings of the secondary bronchi. Thereafter the silver nitrate was applied. Syme states that the results were surprisingly good.

References.—[1]*Ann. Otol.* 1917, June, 397; [2]*Med. Rec.* 1917, ii, 10; [3]*Brit. Med. Jour.* 1917, i, 868.

BACTERIA, LIFE-HISTORY OF. *Herbert French, M.D., F.R.C.P.*

All students of bacteriology are familiar with the fact that under various cultural and other changes in environment, micro-organisms are apt to develop changes in shape, size, and so forth, which are spoken of generally as atypical or involution forms.

E. C. Hort[1] brings to our notice some novel views upon the subject, based on careful laboratory work of his own, and his paper, with its illustrations, should be consulted. He urges that these involution forms, far from being unimportant, are probably part of a life-cycle of bacteria, far more complex than has been supposed. He propounds the view that micro-organisms, instead of always multiplying by simple binary fission in the way that is generally presumed, probably have other—hitherto unrecognized—methods of multiplication. Hort's paper is well worth studying, for it makes one think; he rouses respect for neglected 'involution forms,' and his desire that they should be studied more thoroughly should lead to discoveries of great medical importance.

Reference.—[1]*Brit. Med. Jour.* 1917, i, 571.

BERI-BERI. *Sir Leonard Rogers, M.D., F.R.C.P.*

Vedder[1] writes further on this subject, and states that the undermilled rice which prevents beri-beri is difficult to keep and liable to become infested with weevils and other insects. Java authorities have found that it may be preserved without harm by placing here

and there among the rice, bottles or tins containing chloroform or carbon tetrachloride. Various legumes, as white beans and peas, and barley, prevent the disease. He discusses the relationship between the wet and dry forms, and suggests each may be due to a different vitamine. Hitherto it has been difficult to produce wet beri-beri experimentally in animals, but he and Rommel have recently caused it in pigs by feeding them on polished rice. He thinks the vitamine is an essential building constituent of nerve tissue, but the exact chemical nature of the substance is not yet known. For the prevention of beri-beri, **Beans**, **Peas**, and other legumes should be given at least once a week, together with some **Fresh Vegetables** or **Fruit.** White potatoes and fresh meat should be given at least once a week, and preferably every day, and barley used in all soups. Canned peas, etc., are useless for the purpose. G. M. Findlay[2] lays stress on the value of **Yeast** in prevention, and says a palatable dish can be made by stirring up dried yeast with milk to form a paste and sweetening it with sugar.

J. Mulvany[3] records the body weight weekly in a patient who developed beri-beri and recovered from it while in gaol. Four weeks after conviction he developed early symptoms of the disease, and he lost 11 lb. in weight during the next six weeks. With the onset of the dropsical stage there was a temporary gain in weight. On his recovery he steadily regained the lost weight.

References.—[1]*Military Surgeon*, 1916, Oct., 368, and *Jour. Amer. Med. Assoc.* 1916, ii, 1494; [2]*Pract.* 1917, Jan., 69; [3]*Ind. Med. Gaz.* 1917, March, 98.

BILE-PASSAGES, SURGERY OF, (*See* Gall-bladder.)

BLADDER, DISEASES OF. *J. W. Thomson Walker, M.B., F.R.C.S.*

Kretschmer,[1] in a valuable article, describes his observations on the use of *cystography.* This consists in filling the bladder with a fluid opaque to the *x* rays, and obtaining a shadowgraph. The fluids found suitable were a 20 per cent solution of cargentos and a 10 per cent solution of thorium nitrate, the latter being preferred owing to the staining caused by cargentos. This method has been used to settle the dispute as to the part played by the true vesical sphincter in closing the bladder outlet, and has led to the unanimous opinion that the internal sphincter causes bladder closure, and that no funnel or neck of the bladder is formed by the posterior urethra. Kretschmer's observations support this view, and he found that the same held good for children as for adults.

Regurgitation of fluid into the ureter was demonstrated in a number of children and adults. Normally, the uretero-vesical junction or valve is supposed to prevent a reflux of fluid from the bladder up the ureter and into the kidney. Failure of this mechanism is of serious moment, especially in cases in which the bladder is the seat of infection, as infection may be directly transmitted upward to the higher urinary tract. In children there was regurgitation of fluid four times

in eleven cases, and in three of the four the urinary tract was normal. In one adult showing regurgitation both the bladder and the ureteric orifices were normal on cystoscopic examination. In five adult cases with regurgitation there were associated lesions of the urinary tract.

Cystoscopic examination does not always give information as to whether the ureter is dilated or not, and in some cases examined the ureteric orifices appeared normal, while cystography demonstrated that the uretero-vesical valve was inefficient, and the ureter dilated. *Displacement of the bladder* was demonstrated in two cases. A change in shape of the bladder was noted in one case as due to pelvic inflammation. Incomplete filling of the bladder was noted in lesions outside the bladder, and in lesions of the bladder wall, such as tumours. *Diverticula* can be recognized by the cystoscope, but their extent cannot be estimated. Cystography is the best method by which the extent of a diverticulum may be demonstrated. In *benign hypertrophy of the prostate*, the cystograph generally shows widening of the base, and the enlarged gland seems to elevate the bladder so that it is carried away from the symphysis. In *carcinoma of the prostate*, nothing uniform was demonstrated. In *malignant degeneration of papilloma* a lack of distention may be demonstrated, and in *malignant growths* there is a defect of distention, variation in density, and diminished capacity.

Stevens[2] discusses *exstrophy of the bladder*, with special reference to operative treatment. To reduce to a minimum the possibility of infection of the kidneys following ureteral transplantation, one should avoid (1) ureteral obstruction from twist, kink, or constriction: (2) injury to the ureteral orifice; and (3) injury to the blood-vessels and nerves in the wall of the ureter. The existence of a case of exstrophy of the bladder not operated on is very wretched, and the mortality is high. Marion says 90 per cent die at birth or in early childhood, while Vigneau and Berger state that 50 per cent die under ten years, and only two-thirds of those surviving pass the twentieth year. Death is due in a very large proportion of cases to ascending infection. Maydl's and Bergenheim's operations are pre-eminent as the procedures of choice. They relieve the pain, and practically always give urinary control. In Maydl's operation the immediate mortality is 28·1 per cent; of 69 recoveries from operation, 66·7 lived over one year, and 26·1 per cent over five years. Bergenheim's operation consists essentially of the independent extraperitoneal implantation of the ureters, each with a rosette of bladder wall, into the rectum, with removal of the bladder. It is known also as Pozza's operation, and as Peters's operation. The immediate mortality, according to Stevens's figures, is 15 per cent. Of 28 recoveries from operation, 60·7 per cent have lived over one year, and 21·4 per cent over five years. Stevens looks upon the Bergenheim operation as simpler, and it is extraperitoneal and has a lower immediate mortality. After recovery from operation the outlook is about the same. The author records a case alive five years after the operation.

Diverticula of the bladder forms the subject of an article by Thomas.[3] Diverticula round the meati of the ureters are probably anomalies of mesonephric-duct buds which normally form the ureters. The failure of the urachus to close may account for some of the sacs at the top of the bladder. The rôle that obstruction plays in the formation of these anomalies is not clear, but clinically in a large percentage of cases it seems necessary for the development of symptoms. Thomas divides diverticula into two groups, congenital and acquired. The congenital are hour-glass bladder, and double, split, or bifid bladder. The acquired type may be divided into intra-uterine, obstructive, and traumatic.

From January, 1908, to November, 1915, 27 cases of diverticulum of the bladder were observed at the Mayo clinic ; 14 of these patients were operated on, 7 were not operated on, and 6 cases were found at autopsy.

Lowsley,[4] after discussing certain *obstructions at the vesical orifice*, concludes that obstructive tumours at the vesical orifice, exclusive of adenomatous hypertrophy of the prostate proper, are due in 77 per cent of cases to a hypertrophy of the subcervical group of tubules, in 12 per cent to a hypertrophic change of the musculature of the trigone at the vesical orifice. In 4·5 per cent, tumours arising from the subtrigonal group are present, 3·5 per cent of the cases show a fibrous stricture of the vesical orifice, and 2·5 per cent have cystic conditions which cause obstruction. The prostate proper is only atrophied when the obstructive mass is due to a fibrosis of the vesical orifice. The subcervical tubules are also atrophied in such a case. Treatment should consist of **Dilatation** with sounds, **Massage,** and **Instillations,** in slight cases. In marked cases with considerable residual urine, the operation of choice is Young's punch operation. Chetwood's **Galvano-cautery** and the **High-frequency Current** may be used in certain cases. Suprapubic cystotomy is never needed.

Randall[5] has studied 300 autopsies in the adult male, ranging from eighteen to eighty-three years of age, with a view to demonstrating the gross pathological characteristics of median-bar formation. There were 54 (18 per cent) cases of median-bar formation. Of these, 18 were large bars which without doubt caused urinary obstruction and retention during life : these represent 6 per cent of the 300 cases. In the remaining 36 cases (12 per cent) the bar formation was small, and was not associated with changes that would indicate undoubted urinary obstruction.

From this study the author concludes : (1) Age is not a determining factor as to the type of bladder obstruction ; (2) The fibrous types of median bars are due to chronic inflammation which is part of a chronic prostatitis ; (3) A glandular type exists entirely apart from general prostatic hypertrophy.

In a Hunterian Lecture, Thomson Walker[6] describes his observations on *the bladder in gunshot injuries of the spinal cord*, based on over 450 cases. The condition of the urinary tract is the most important

clinical factor in these cases of spinal injury. Urinary infection may be a contra-indication to operation on the spine, or it may cause death after an operation. It may be fatal where operation has already given promising results, or where, without operation, the case is showing signs of improvement in the nerve lesion.

A sequence of two distinct stages was observed in these cases : (1) A stage of complete retention commencing at the time of the injury, during which the bladder is distended with urine. After a time the urine begins to dribble away, the bladder remaining distended (retention with overflow). The duration of this stage was on an average fifty-five days. (2) A second stage of periodic reflex micturition, or active incontinence, succeeds the first stage, and, unless improvement in the spinal lesion takes place, this is the permanent state of the bladder.

There is a transition stage between the first and second stages during which the bladder is still distended, or partly distended, with urine, but active contraction of the bladder wall takes place. The bladder gradually becomes more contracted, until the quantity of urine left after micturition is very small, or there is none at all. In the fully-developed second stage the bladder is a purely reflex organ. The urine collects until the set capacity of the bladder is reached, and is then discharged in a powerful stream. The act is involuntary, and the capacity of the bladder depends upon the presence and severity of cystitis.

This sequence of complete retention followed by active incontinence, with an intermediate stage, was observed in all lesions of the cervical, dorsal, and also of the lumbar region of the cord, and occurred even when the lumbar enlargement (and therefore the micturition centre) was destroyed. It developed in more than half the cases of cauda-equina lesion. Urinary infection is the most common and most fatal complication in gunshot wounds of the spine, and was the cause of death in practically all fatal cases. The infection was due to the catheter, and occurred in the first few days after the injury. The cystitis was of a particularly virulent hæmorrhagic type. Ascending septic pyelonephritis was the fatal complication in all cases, and was due to intermittent catheterization, permitting repeated distention of the bladder with infected urine.

The treatment of the urinary tract consisted in provision for the removal of the urine, and treatment of septic complications. Intermittent catheterization was the method universally adopted. The tied-in catheter had been used in some cases. This method was unsuitable, as it caused sloughing of the urethra and fistula. The author strongly insisted that **Suprapubic Cystotomy** should be done in all cases before any catheter was passed, and therefore before the bladder had been infected and ascending pyelonephritis resulted (prophylactic cystotomy). The object of the suprapubic cystotomy was to give free drainage of the bladder, and prevent intravesical tension forcing infected urine up the ureters and causing septic

pyelonephritis. When cystitis was already present, suprapubic cystotomy should still be performed, in order to treat the cystitis and to prevent recurrent ascending infection.

Besley[7] states that *distention of the bladder* in gunshot wounds of the spinal column is not harmful to the bladder or kidneys, and he suggests that these cases should be left alone without the use of the catheter or other means of emptying the bladder.

Burns[8] discusses the bladder changes due to *lesions of the central nervous system.* There is a loss of tonicity, often gradual accumulation of residual urine, and in some cases a dilatation of the bladder. Incontinence occurs in a large majority of cases. When this exists there is a dilatation of the internal vesical sphincter, and a funnel-shaped posterior urethra which is readily demonstrated cystoscopically and radiographically. The incontinence may be retention with overflow, or due to paralysis of the sphincter and paralytic incontinence without residual urine. Trabeculation of the muscular wall, although generally present, is inconstant in its distribution. The trigone is usually found atrophic. Burns admits that there is "a class of cases in which cystoscopic and röntgenographic pictures are absolutely typical of disease of the central nervous system, but in which no evidence of such disease can be demonstrated clinically or serologically." [These cases were described by the collator in 1910,[9] but have not previously been recognized in America. Burns adopts his explanation of the cases, namely, that the lesions occur in the ganglia or peripheral nerves.—J. W. T. W.]

The most effectual form of treatment consists in intravenous and intraspinal therapy, combined with dilatation of the urethra.

Nasetti[10] describes one personal case of *purpura.* and five cases occurring in the literature are noted. True purpura of the bladder is distinguished from the hæmorrhages which occur in hæmorrhagic cystitis which are named pseudo-purpura. Hæmaturia occurs in all cases. There is pain on micturition which may amount to strangury. The urine may be sterile, or may contain bacteria. The temperature is usually normal. Cystoscopically the bladder mucous membrane shows numerous spots of hæmorrhage of varying size, scattered over the whole surface, or more often localized to the base. An ulcer may develop from a hæmorrhagic spot.

Geraghty[11] reviews briefly the present views regarding infection of the bladder, and draws particular attention to *localized cystitis.* Organisms of the colon group are the most frequent cause of cystitis, both acute and chronic. In many cases the infection is a mixed one. The old idea that acid cystitis is usually due to tubercle bacillus is no longer tenable. The urine in the vast majority of cases of simple cystitis is acid. The colon bacillus, the staphylococcus, varieties of the streptococcus, the gonococcus, and many other organisms, are usually associated with acid cystitis, while organisms belonging to the proteus group are usually associated with an alkaline cystitis, and produce the well-known ammoniacal, ropy, mucoid urine.

Different bacteria show a predilection for different parts of the urinary tract. The primary focus of tuberculosis in the urinary tract is practically always in the kidney, the earliest lesion being usually in the upper pyramidal areas. The bladder is practically always infected from the kidney. The anterior urethra is very resistant to tuberculous infection. The gonococcus is one of the few organisms capable of infecting the anterior urethra without predisposing injury to the mucous membrane. The posterior urethra is also affected, but the bladder, except the trigone, and the kidney, are rarely affected by the gonococcus. The typhoid bacillus attacks principally the kidney, and usually produces lesions of very mild degree, the result being a bacilluria, rarely with pyuria. The colon bacillus, staphylococcus, streptococcus, *Bacillus pyogenes*, and other organisms, attack the kidney, bladder, and posterior urethra with equal facility, but rarely the anterior urethra. The *Micrococcus ureæ* implants itself only in the prostatic urethra, and does not set up cystitis or infect the kidney. The organism splits urea, and liberates ammonium carbonate, and renders the urine alkaline, precipitating triple and dibasic phosphates. This infection, although causing only slight irritation, is very resistant to treatment.

The treatment of a case of simple cystitis consists in placing the bladder as far as possible at rest. **Sedatives** are freely given, and, if necessary, **Morphia,** and the amount of fluids ingested is diminished. To combat the increased acidity of the urine thus concentrated, **Alkalies** are given until the urine becomes alkaline. Urotropine is useless, as, if the urine remain acid, the formaldehyde liberated only increases the irritation, and if the urine is alkaline, the urotropine will not be broken up, and formaldehyde will not be present. When the symptoms do not subside, it usually means that there is some complication keeping them up, and an investigation of the whole urinary tract should be undertaken. Cases are seen where the persistence of the vesical infection is not due to any contravesical factor, and consists of areas of specially resistant infection. Irrigation of the bladder with **Silver Nitrate** solution, or other silver salts, quickly cures these areas. For more resistant areas of cystitis, Geraghty fills the bladder with salt solution. A catheterizing cystoscope is passed, and a ureteric catheter with terminal eye. A 10 or 20 per cent silver nitrate solution is injected directly in the area, the excess of silver nitrate solution being neutralized by the salt solution in the bladder. In women, local patches can be touched with strong solution through a Kelly's tube. Where local applications fail, resection of the area by operation may be necessary for cure.

O'Neil[12] describes the results in a number of cases of cystitis of the injection of an **Emulsion of Bacillus Bulgaricus.** Emulsion made from tabloids was found to be contaminated with a large Gram + staphylococcus. Liquid culture put up in 10 c.c. tubes was pure, and this form was used. Of this pure culture 20 c.c. were injected daily through a catheter, after preliminary irrigation. At the same

time sodium acid phosphate was given. Two groups of cases were treated—those showing incrustation on the bladder wall only, and those which, in addition, show a marked tendency to the formation of phosphatic calculi.

Cifuentes[13] describes the treatment of a case of chronic cystitis of twenty-three years' duration, by means of **Iodine Fumes.** Iodoform was placed in a spindle-shaped glass receptacle, the open ends of which were drawn to permit a rubber tube to be connected with each. The iodoform is heated over a spirit lamp, and the fumes of iodine are pumped through a catheter into the bladder. Eight applications were required in the case described, and improvement took place after the third. Cifuentes suggests the use of this method in tuberculous cystitis, but states that it is valuable in all cases of chronic cystitis. The precaution should be taken to keep the amount of air injected within the capacity of the bladder, previously determined.

An important article by Pedersen[14] on *syphilis of the bladder* reviews the literature, and he describes two undoubted and two probable cases of this condition. The forms under which secondary syphilis of the bladder appears are very similar to, and are often practically identical with, the non-specific lesions known as simple hyperæmia, simple ulcer, and papillary growths. The hyperæmia of bladder syphilis is said to appear as discrete reddish spots, like macules, sometimes referred to as roseola of the bladder. It may be symptomless. The characteristic ulcer is like the specific ulcer on any mucous membrane, situated in an area of œdematous infected mucous membrane, with a grey base and definite prominent firm edges. The ulcers are usually multiple in clusters, rarely disseminated, and often grouped about or adjacent to one or both ureter mouths. They may readily be mistaken for tuberculous ulcers, especially where symptoms of cystitis are present. The papillary growths of secondary syphilis have no features recognizable by cystoscopy that will differentiate them from ordinary papillomata, or from the villous growth surmounting a malignant base. The gumma of the bladder is equally difficult of diagnosis by inspection, and resembles an infiltrating malignant growth. By cystoscopy alone, therefore, the diagnosis of bladder syphilis cannot be made. It must be supported by one, at least, of the following: history of syphilis, Wassermann's reaction, syphilitic signs elsewhere, or the treatment test. The author concludes that syphilis of the bladder is often overlooked or non-recognized. If it is diagnosed and treated, the prognosis is good.

Baker[15] describes a case of syphilis of the bladder, and reviews the literature of the subject. The condition is seen more commonly in the tertiary stage, and the lesions consist of ulcers or tumours of papillomatous type. In the late secondary stage, and in the tertiary stage, diffuse or patchy hyperæmia is constant. The most common site for syphilitic lesions is the base of the bladder, just external to the ureters, but any part of the wall may be affected. According to

the author, the tertiary lesions show no tendency to spontaneous cicatrization, but spread on the surface and deeply, and eventually perforation occurs. The diagnosis, he states, is based upon the exclusion of other common diseases, a strongly positive Wassermann reaction, and the disappearance of all symptoms and lesions under antisyphilitic treatment.

The pathology of *tumours of the bladder*, with particular reference to the diagnosis of papilloma and carcinoma, is discussed by Buerger.[16]

Certain abnormalities in the conformation of the cells indicate the presence of either primary carcinoma, or carcinomatous change in papilloma. These abnormalities are cells manifesting irregularities in shape and size, muscles rich in chromatin, staining deeply, and of bizarre shape; cells with atypical mitoses, giant cells, and multinuclear cells. All these, when occurring in papillomata of the bladder, indicate the presence or beginning of carcinomatous change. Buerger allows that certain variations in the type cells belong to the benign growths, and that the proper estimation of such changes depends to a great extent upon personal interpretation; and that, further, no hard-and-fast rules can be laid down. Another evidence of carcinomatous change is found in a disturbed relationship of the cells to each other, in a loss of the typical palisade arrangement of the cells, in the presence of long fusiform or compressed types of cells, in evidence of infiltration of the stroma and penetration of the basal membrane, and in the presence of epithelial cells in the submucosa or muscular coats of the vesical wall. These criteria were found to be present in parts of the tumour that were accessible by means of cystoscopic instruments. The changes indicative of malignancy occur first in the epithelium, not far from the surface, either with or without areas of infiltration.

In discussing the surgical treatment of vesical neoplasms, Beer[17] states that all benign cases suitable for cystoscopic **High-frequency Cauterization** can be definitely cured by this method. The following types of case are unsuitable: (1) Patients who are intolerant; (2) Patients who bleed furiously on every application; (3) Patients whose tumours are inaccessible; (4) Patients suffering from papillomatosis of the bladder. These cases, and also all those of extensive benign recurrence, should be treated by suprapubic cystotomy and removal by the cautery. A partial cystectomy by means of the cautery is recommended in cases of papilloma which appear clinically benign, but do not respond promptly to endovesical high-frequency cauterization. When the growth appears malignant cystoscopically, partial or total cystectomy should be performed at once.

Geraghty[18] reviews the treatment of bladder tumours at the Brady Urological Institute. He divides them into benign and malignant papillomata, papillary carcinoma and adenocarcinoma, squamous and scirrhous carcinoma. In malignant papillomata there are changes in shape, staining properties, and nuclei of the epithelial cells, without any evidence of infiltration. Experience has shown that patients

die of cancerous metastases when these changes in the papilloma are the only evidence of malignancy. When the malignant papilloma has advanced to a point when infiltration of the bladder wall has occurred, the author uses the term 'papillary carcinoma.' Portions of bladder tumours have been excised cystoscopically and examined histologically, but in the vast majority of cases there was not sufficient evidence to indicate whether the tumour would respond to fulguration, or whether more radical procedures should be adopted. Cystoscopy and the clinical methods proved of greater service than histological examination in differentiating between malignant papilloma and papillary carcinoma.

Fulguration was employed in 53 cases, 12 of which were inoperable carcinomata, fulguration being here employed as a palliative measure. In none of the carcinomata did the treatment make any impression on the tumour. There was a marked difference in response to fulguration between benign and malignant papillomata. The typical benign papillomata vanished rapidly, while the malignant type disappeared slowly. Of 25 papillomata examined histologically, 17 showed the changes characteristic of malignant papilloma, but all were removed by fulguration, the benign and malignant differing from each other only in that the response was slower in the malignant types. Of the 36 patients on whom fulguration was successful in removing the original tumour, recurrences are known to have occurred in 7, and in all of these it took place under a year. The tendency to recurrence grows progressively less after the first year.

Thirty-four cases of bladder tumour were treated by **Excision,** and of these only four were known to be well and free from recurrences during a period of four years or over. Excision should be used only in cases which ordinarily would be suitable for fulguration, but in which, on account of some complication, that treatment has become impossible or very difficult.

When the growth has infiltrated the bladder wall, **Resection** of the whole thickness of the wall, with a wide margin of healthy mucous membrane, is the only method that offers any hope of success. The transperitoneal method, except in occasional cases, is not to be recommended. Resection was carried out in 24 cases, and 9 of these were well two years or longer after the operation. Of these 9, 5 belonged to the malignant papilloma type, and 4 were small circumscribed papillary carcinomata.

Radium was used most frequently in combination with fulguration, and the effect has been striking. In three cases in which fulguration had been employed over long periods of time, and which had resisted very stubbornly, radium seemed entirely to change their nature, and they disappeared rapidly on resuming fulguration. He had not, however, succeeded in definitely eradicating the papillary or other infiltrating types of carcinoma.

Cystectomy appeared, from the results, to be unjustifiable. A large percentage of cases were so advanced on first being examined, that only palliative measures were adopted.

Thomson Walker[19] discusses the treatment of papilloma of the bladder by the **High-frequency Current,** and describes the technique of the bipolar method, or **Diathermy.** The duration of an application varies according to the number of growths and their size, the condition of the bladder, and the temperament of the patient. He found that the instillation of ½ dr. of 2 per cent **Nitrate of Silver** solution at the end of each sitting was of great assistance in cases of multiple papillomata, especially where friable masses of growth crowd thickly around the bladder outlet. After destruction of papillomata, a small area of ulceration, covered with a grey slough, is found, and is surrounded by a ring of raised bright-red velvety mucous membrane. This heals in about three weeks. After repeated applications of the cautery, small pits may be left in the bladder wall, and occasionally a patch of local atrophy of the muscular layer may be observed, with pronounced trabeculation and deep intervening saccules. Pain in the abdominal wall was sometimes observed following the treatment,

DESCRIPTION OF PLATE VII.

Fig. A.—A papilloma after withdrawal of the electrode, showing necrotic tissue at site of application and adhering to the electrode.

Fig. B.—Partly-destroyed papilloma and an oval ulcer with adherent slough and surrounding inflammation.

Fig. C.—Ulcer after destruction of papilloma, showing oval shape and surrounding rampart of swollen mucous membrane.

Fig. D.—Pitting of bladder wall after healing of ulcer (below and to right); ulcer from recent cauterization, with adherent slough and raised edges (above and to left); small ulcer with surrounding œdema (to right).

Fig. E.—Trabeculation and sacculation occasionally observed some months after high-frequency treatment.

and might result from the action of the current on the sensory nerves. An interval of one to three weeks should elapse between treatments.

The microscopical changes were of two types. In the first, the epithelial covering of the villi was intact, but the thin-walled vessels were engorged with blood and greatly distended, and in places were ruptured. This was probably due to thrombosis. In the second type these vascular changes were similar, and in addition there was loss of staining power of the transitional epithelium, or in a more advanced form the epithelium was completely disintegrated. This was probably due to the direct cauterizing effect of the current.

Difficulties in the method were due to the growth lying in a position difficult of access, such as the apex of the bladder, immediately round the internal meatus, behind a fold or an intravesical projection of the prostate. Again, a bladder which did not permit of full distention and free intravesical manipulation caused difficulty. The mind and temperament of the patient might also create difficulties. The

PLATE VII.

PAPILLOMA OF BLADDER

Fig. A.

Fig. B.

Fig. C.

Fig. D.

Fig. E.

W. THORNTON SHIELLS

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method was especially suitable for small single papillomata in good position. It was valuable in the early stage of recurrence after open operation. The following types were unsuitable for this treatment: very large papillomata, multiple coalescing growths, septic growths, some papillomata situated in the immediate neighbourhood of the internal meatus, and malignant growths. In 14 out of 33 cases of simple papilloma (42·4 per cent) the growth was completely destroyed at one sitting. (*See Plate VII.*)

Barringer[20] reviews a year's work with **Radium** in the treatment of *carcinoma of the bladder and prostate*. In carcinoma of the prostate, striking results were obtained both in early and in advanced cases. In early cases where the carcinoma was fairly well confined to the prostate, and in which there was little or no perivesicular infiltration, shrinkage of the carcinoma occurred in all. In the observed cases this reduction was permanent. Ten months was, however, the longest period of time for which any of these had been followed. The symptoms in these cases showed striking improvement.

The technique used was to place the radium in the end of a 4- or 6-inch needle, extending 1 to 1½ inches along the shaft from the tip. The needle was inserted through the perineum into the prostate. Anæsthetization of the perineum and prostate with 0·5 per cent novocain and epinephrin made the insertion of the needle practically painless. The needle was allowed to remain in for about twelve hours, during which time little or no pain was felt, and the patient could either micturate or was catheterized. There was pain in the prostate, and frequent micturition, beginning three days after the application and lasting a number of days or weeks. The treatment was repeated in two or three months. The primary effect was to increase residual urine, but the ultimate effect was neither to increase nor decrease it. Radium has a sclerotic effect on carcinoma; it has absolutely no effect on hypertrophied prostate. Very large carcinomas, with cachexia, were beyond radium treatment.

In bladder carcinomata, a capsule of screened radium was placed in the bladder, and allowed to remain for six to ten weeks. If the carcinoma is on the vault or lateral wall, the patient lies on the abdomen or side. There may be no after-pain, or pain lasting some days to several weeks. The cases treated numbered 16, and of these 4 (1 early and 3 advanced) were cystoscopically free from growths. "one for ten and a half months, one for five months, and two recently."

References.—[1]*Surg. Gyn. and Obst.* 1916, ii, 709; [2]*Ibid.* 702; [3]*Ibid.* 378; [4]*Jour. Amer. Med. Assoc.* 1917, i, 444; [5]*Surg. Gyn. and Obst.* 1917, ii, 170 (abstr.); [6]*Lancet*, 1917, i, 173; [7]*Jour. Amer. Med. Assoc.* 1917, ii, 638; [8]*Surg. Gyn. and Obst.* 1917, i, 659; [9]*Ann. Surg.* 1910, 577; [10]*La Clinica Chirurgien*, 1916, Oct., 1269; [11]*N. Y. Med. Jour.* 1916, ii, 838; [12]*Ann. Surg.* 1917, May, 621; [13]*Jour. Amer. Med. Assoc.* 1917, ii, 678 (abstr.); [14]*Med. Rec.* 1916, ii, 235; [15]*Surg. Gyn. and Obst.* 1917, i, 187; [16]*N. Y. Med. Jour.* 1916, ii, 841; [17]*Surg. Gyn. and Obst.* 1917, i, 646; [18]*Ibid.* 655; [19]*Brit. Jour. Surg.* 1916, Oct., 259; [20]*Jour. Amer. Med. Assoc.* 1917, i, 1227, and 1916, ii, 1442.

BLOOD-PRESSURE. *C. F. Coombs, M.D., F.R.C.P.*

Causation.—Cyriax[1] alleges that *irritative states of the spinal extensors* are often responsible for a heightened blood-pressure. He subdivides these states into hypertonus, diffuse fibrositis, and venous congestion. The clinical evidences of each are described in detail. One interesting suggestion is, that the thick neck associated from time immemorial with a tendency to apoplexy is merely a sign of hypertonus in the cervical region. The *modus operandi* of these conditions is by production of a continuous series of sensory stimuli to the posterior spinal nerves evoking a continued pressor response. The detection of these causes is important, as Cyriax claims that successful treatment can be instituted in such cases.

Diagnosis.—Molle[2] says that it is worth while paying attention to the oscillations of the leg when crossed over the other limb, as a sign of high blood-pressure, when the sphygmomanometer is not available. At a systolic pressure of 160 mm. Hg and upwards these oscillations became distinctly perceptible, especially when observed from a lateral position.

Fantus[3] describes the apparatus devised by him for the registration of the blood-pressure continuously over prolonged periods. His paper, which is likely to appeal to laboratory workers, is well illustrated. He suggests the possibility of applying such methods to clinical medicine, e.g., for the watching of the effect of the nitrites on a high blood-pressure; but it is doubtful whether the accuracy of result is worth the trouble involved.

There is still a good deal of controversy as to what ought to be labelled high pressure. Some still stick to a belief in the supreme importance of the systolic pressure. An increasing number of observers insists on the diastolic pressure as the crucial factor. Faught[4] contributes a careful consideration of these rival claims, as well as of others who put forward various formulæ based on blood-pressure observations as capable of discovering the precise efficiency of any individual's circulatory pump. His conclusions are such as will commend themselves to most unbiassed observers: "Blood-pressure observations, to be of value, must be accurately made and recorded; and averages based on a series of observations are of more value than isolated tests. The systolic pressure alone is of far less clinical value than when considered in relation to diastolic pressure, pulse-pressure, and pulse-rate. Formulæ for the determination of cardiac load and overload, based upon the diastolic pressure and pulse-pressure, should be used with great caution, as it is probable that they do not give the information ascribed to them. Cardiac energy . . . is probably best indicated in sphygmomanometry by the systolic pressure alone, although it may be profoundly modified by the pulse-rate. Marked departure from the normal ratio of 3 : 2 : 1 between systolic, diastolic and pulse-pressures is usually an indication of an abnormal state of the circulation. The maintenance of this 3 : 2 : 1 ratio, even with markedly elevated systolic-pressure,

usually indicates an efficient circulation. Diastolic pressure is our best indication as to the state of peripheral resistance, and is of value in toxæmic, hypertensive, and arteriosclerotic conditions. The value of high systolic pressure and large pulse-pressure findings is greatly increased by careful urinary examinations, as the degree of kidney involvement is usually of more importance in prognosis than the actual height of systolic pressure. A small pulse-pressure in high-pressure cases is suggestive of myocardial involvement. The pulse-pressure is of considerable value in determining circulatory efficiency, and also in indicating the cardiac output. Its significance, however, may be greatly modified by degenerative changes in the arteries, and by the pulse-rate."

As Warfield[5] points out, a rise in the pulse-pressure (i.e., the difference between the systolic and diastolic pressures) must always be held to possess considerable significance, whatever its cause. In his experience, high pulse-pressure is invariably accompanied by increase in the size of the left ventricle, dilatation of the aortic arch, and increase in the size of all the distributing arteries. The best examples of this syndrome are to be found among cases of aortic regurgitation.

Prognosis.—Cadbury's[6] valuable study confirms the results obtained by most systematic investigations, to the effect that renal disease is discoverable in about three-quarters of all cases of hypertension. The higher the pressures the lower the readings of the phenolsulphonephthalein test. Treatment in hospital usually brought about a fall in systolic, diastolic, and pulse-pressures, especially in the systolic pressure. With cardiac decompensation established, **Digitalis** treatment is apt to raise the systolic and pulse-pressures and to lower the diastolic pressure. Deaths in hypertension patients most frequently occurred between the ages of forty and sixty years, and the underlying condition was either chronic nephritis or chronic disease of the heart, or a combination of the two. More than half the deaths occurred with symptoms of uræmia or apoplexy. Twenty-eight per cent died with signs of progressive heart failure. The patients in more than half the fatal cases had had a systolic pressure of over 200 mm., and 86 per cent had had diastolic pressure of over 100 mm.

Treatment.—Graham-Stewart[7] writes in a spirit of refreshing optimism as to the results attainable by his plan of treatment. He says that it can be relied on to reduce dangerously high pressures to a level of comparative security, and also to control pressures which threaten to rise into the zone of danger. He makes, however, a reservation to the effect that if the treatment fails to achieve these highly desirable ends, the case is probably one of granular kidney. In view of the findings of Cadbury referred to above, and of similar researches by others, which show that really high pressures are nearly always accompanied by renal disease, this reservation rather destroys the hopes raised by Graham-Stewart's claims. But as his plan is eminently sensible and is not difficult to follow out, it is worth while quoting his own outline of treatment in full.

1. An attempt is made to remove any source of toxæmia—e.g. intestinal stasis, pyorrhœa, septic tonsils, etc.

2. All muscular and mental strain is prohibited.

3. The *diet* is carefully arranged so as to avoid, as far as possible, all purin-containing articles. All red meat and all meat extractives are forbidden, and especially the organs of animals. The very lightest of meals are advised, and any over-loading of the stomach is warned against.

4. Regular hours of *recumbent rest* are to be taken, and regular gentle *exercise in the open air*. Long hours of sleep are strongly advised; sleep is an efficient reducer of arterial stress.

5. The *skin* is kept active, and the *urine* free, as far as possible, of lithuric deposit.

6. *Alcohol* is prohibited, except in the case of the feeble and in those in whom a small amount of stimulant aids digestion.

7. The patient is warned *never to get out of breath* if possible. Getting seriously out of breath from exertion will sometimes upset the blood-pressure balance for days or even weeks.

8. Regular *and efficient* doses of **Magnesium** or **Sodium Sulphate** are to be taken *every morning*. These salts are useless unless taken in sufficient quantity to ensure a *watery* action—a genuine catharsis. *It is this extraction of fluid through the bowel that is the essence of the treatment.* Nothing else will so reduce—and keep reduced—a high vascular tension as this daily loss of fluid. Its action is almost specific. It almost at once relieves the breathing, the headaches, and the giddiness, reduces the venous turgescence, and lowers the pressure. It is only by explaining to the patient the exact result one wishes to produce on the bowel, and the rationale thereof, that one will ever get intelligent and active enough co-operation. One to four drachms may be necessary.

Stoll[8] lays stress on the importance of being on the look-out for high tension in cases where it is not obvious; for instance, in heredo-syphilitic children, in pregnancy, and so on. He thinks that in many cases there is a latent syphilitic factor, and advises treatment along these lines even when there is no obvious evidence of syphilis. He speaks highly of the **Phenolphthalein Test** as a means of estimating the functional efficiency of the kidneys, and urges its application even when ordinary methods of urinary examination discover no evidence of renal disease. He emphasizes the value of a **Milk Diet** and a quieter life in the case of the bustling business man who eats too much and too fast.

Levison[9] also writes an interesting paper on the relation of syphilis to high arterial tension, based on eighteen cases in which he regards a causal connection as probable. This connection, where it exists, is possibly by way of renal disease, possibly by a more direct action of the spirochæte on the arterial tissues. His conclusions are to the effect that antisyphilitic treatment applied to syphilities who also have arterial tension may sometimes be followed by a fall of tension,

but that this cannot be expected as a general rule. At all events, the association of high tension with syphilis does not contra-indicate treatment of the latter. He has not found **Mercury** and **Salvarsan**, used carefully, detrimental to kidneys damaged by arterial disease.

Snow[10] speaks warmly of the **High-frequency Current** coupled with the other measures that are appropriate to each individual case. He adds the following directions as to technique: "To get the best effect upon the metabolism and to lower blood-pressure, a true **d'Arsonval Current** is necessary. It is a subject of regret that most of the manufacturers are putting out for high-frequency treatments closed or open circuit transformers which produce only oscillating currents. With this type of apparatus the current passing to the condenser is always alternating, and the quality of the current produced is likewise oscillatory and cannot be rendered directional or pulsatory as it can with the true type of d'Arsonval apparatus. A Ruhmkoff coil with a mechanical interrupter and a resonator is an ideal apparatus for the administration of autocondensation, when operated on a direct-current circuit or high-speed static machine. This, with an autocondensation couch provided with a thick cushion and proper resonator, is in accord with the physical law, as described in the "Report of the Committee of Physicists," which gave us a most valuable key for the employment of electric current. With the true d'Arsonval current administered with the patient seated upon the thick dielectric and his body capacity on one side of the dielectric and a fairly long spark-gap in the circuit, the current becomes largely pulsatory, the inverse current being slight. If the apparatus is connected in such a manner that the positive phase of the current is administered to the patient the effects are far more beneficial. With this arrangement it is necessary to administer but 500 ma. for the conventional twelve minutes to obtain the maximum effects upon the pressure, and this without overheating or surcharging the patient."

Luke[11] also preaches the use of physical agents. He considers the **Electric-light Bath** or the **Dowsing Radiant-heat Bath** to be preferable to the ordinary Turkish bath. A temperature of 180° for fifteen minutes suffices. It should finish with a good shampoo. On alternate days a **Vichy Douche** may be given. He still believes in the **Nauheim Effervescent Bath,** and finds a fall of 20 mm. not uncommon after a bath of this kind. **High-frequency Currents** and the **Schnee Four-cell Bath,** arranged to run the current from feet upwards, are also praised. Finally, he speaks highly of **Spinal Percussion** with an electric vibrator, the method introduced by Abrams, of San Francisco, the seventh cervical spine being the one selected. Luke says that a few minutes of this application never fails to bring the pressure down by 10 to 40 mm. Hg. He does not offer any theory of this action.

References.—[1]*Pract.* 1917, ii, 468; [2]*Jour. de Méd. de Paris*, 1917, Mar.; [3]*Jour. Amer. Med. Assoc.* 1917, i, 1807; [4]*Med. Rec.* 1917, i, 796; [5]*Jour. Amer. Med. Assoc.* 1917, i, 824; [6]*Arch. Int. Med.* 1916, xviii, 317; [7]*Clin. Jour.* 1917, 45; [8]*Med. Rec.* 1916, ii, 757; [9]*Jour. Amer. Med. Assoc.* 1916, ii, 730; [10]*N. Y. Med. Jour.* 1917, i, 5; [11]*Prescriber*, 1917, 72.

BLOOD VESSELS, SURGERY OF. (*See* HEART AND BLOOD VESSELS.)

BOILS. (*See* FURUNCULOSIS.)

BRAIN, TUMOURS OF, *J. Ramsay Hunt, M.D.*

Heuer and Dandy,[1] of the Johns Hopkins Surgical Clinic, present the brain-tumour statistics covering a period of two years. Among the 70 cases which form the basis of this report are included conditions other than true brain tumour, e.g., ependymitis, cerebral tubercle, dural gumma, and aneurysm of the internal carotid artery. Yet the symptoms in these conditions simulated so closely those of brain tumour that operations were usually performed under the supposition that a new growth was present.

Of the 70 patients, 62 were operated upon. Seventy-one major operations were performed, as in several cases an exploratory craniotomy was performed subsequently to a subtemporal decompression. There were 6 deaths, occurring between twenty-four hours and five days after operation—an operative mortality of 8·6 per cent, a case mortality of 9·6 per cent.

In 33 cases the lesion was disclosed at operation, i.e., in 53 per cent of the cases operated upon. The operative treatment consisted in the attempt to remove the lesion completely in 28 cases; in 7 of these a partial extirpation only was possible. In 4 cases the size or situation (in the speech area, etc.) of the growth made an attempt at removal unwise. In 1 case the operation consisted in the partial removal of the dura and hæmorrhagic membrane. Thirty-eight operations were performed upon these 33 patients. There was 1 death, an operative mortality of 2·6 per cent, a case mortality of 3 per cent.

Upon the remaining 29 patients a simple decompression, or an exploratory craniotomy combined with a decompression, was done in 21 instances, a cerebellar exploration and decompression in 13 instances (in five cases, two cranioplastic operations, or both an exploratory craniotomy and a cerebellar exploration, were done). In this group of cases there were 5 deaths, an operative mortality of 14 per cent, a case mortality of 17 per cent.

The immediate results may be summarized as follows: 15 patients left the hospital apparently well; 29 were greatly improved, with the relief of all pressure symptoms; 11 remained unimproved; 6 patients died within from twenty-four hours to five days after operation; 2 patients eventually died in the hospital.

There was a large percentage of glioma cases as compared with other varieties of lesion, and infectious granuloma, tuberculoma, and syphiloma were infrequent.

Of the 11 cysts which occurred in this series, 7 belong to the group of simple serous cysts, one arose from an embryonal *anlage* (Rathke's pouch ?), and 3 were arachnoidal cysts. Five of the seven simple cysts occurred in the cerebellum, which appears to be their seat of

predilection. Although it may be difficult conclusively to demonstrate this association, they appear to be derived from solid tumours.

Symptomatology and Diagnosis.—One of the most important signs of an intracranial new growth is choked disc, and a subjective complaint of disturbance in vision may be a relatively early symptom. Seven of the patients were blind on admission, and in four others vision was almost gone. There seems to be at present less confusion in the recognition and interpretation of choked disc: but how long surgical treatment may be safely delayed in the presence of this condition is apparently as yet not clearly understood. It has been frequently urged that even in the absence of localizing signs, surgical measures should be contemplated as soon as a choked disc can be diagnosed; and the writers believe that the adoption of this teaching would in large measure prevent blindness.

The *x* rays as an aid in diagnosis in intracranial conditions still find their greatest field of usefulness in the diagnosis of hypophyseal lesions; not only in their localization, but from the associated deformities of the sella turcica, in the determination of their size, direction of growth, and, occasionally, their character. Apart from hypophyseal tumours, however, the study of the *x*-ray plates in this series proved of great aid in diagnosis of intracranial new growths; for, while tumours producing a definite shadow are unfortunately uncommon, changes in the skull such as erosion or thickening, or vascular changes, or changes more or less characteristic of internal hydrocephalus, are not infrequent.

Operative Treatment.—In the surgical treatment of intracranial conditions, the approach to lesions and the safe closure of wounds are perhaps of greater importance than similar steps in the treatment of lesions elsewhere in the body.

The control of hæmorrhage from the scalp and bone, which under increased intracranial pressure may be extraordinarily vascular, remains one of the most difficult features in cranial surgery. With its attendant shock, hæmorrhage is one of the most potent factors in the high mortality generally attending cranial surgery, and is responsible in the majority of cases for the adoption of a two-stage procedure. The element of time, so long as hæmorrhage is satisfactorily controlled, is of little importance, and therefore, in forming osteoplastic flaps, motor-driven have little advantage over hand-driven instruments, apart from lessening the manual labour involved.

Types of Operation.—In the treatment of intracranial tumours only four types of operation need be considered: a decompression craniectomy done for the relief of pressure symptoms in cases of unlocalized tumours; an osteoplastic resection for the exposure of cerebral tumours (often combined with a decompression); a cerebellar exploratory and decompressive craniectomy for tumours of the cerebellum and cerebellopontine angles; and the nasal or intracranial operation for the exposure of hypophyseal tumours. In the treatment of cerebral and cerebellar lesions the authors have followed

the procedures as developed by Cushing, to whose writings reference may be made for details.

In the treatment of hypophyseal lesions the nasal approach has been most strongly advocated and most frequently used. Notwithstanding the overwhelming support in favour of this type of operation, the further development of hypophyseal surgery would appear dependent upon a satisfactory intracranial approach. The nasal operation, except in rare cases of hypophyseal cyst, is a purely palliative procedure, and, while comparatively simple, has the disadvantages of a septic approach, a very limited exposure of the region attacked, and a restricted field of usefulness.

One-stage versus Two-stage Operations.—Whether an operation be conducted in one or two stages must be left to the individual preference of the surgeon, a preference dependent, in large part, upon the surgeon's mortality. Recent statistics indicate that, in spite of its disadvantages and added dangers, the two-stage operation is the operation of choice, and it is said by its adherents to be responsible for a lowered operative mortality. Very few statements are at hand to show the cause of operative deaths in brain-tumour cases; but that hæmorrhage and shock, infection (meningitis), pneumonia, and respiratory paralysis (due to tumour pressure, sudden dislocations, cerebral œdema, etc.), are the most common causes, is evident.

Treatment of Intracranial Tension.—Under conditions of increased intracranial tension, the opening of the dura becomes one of the most important steps in a cranial operation. If the dural tension is not relieved, the opening of the membrane may result in rupture of the cortex, with all its attendant difficulties and complications, or in the sudden dislocation of structures, leading to respiratory paralysis. Relief of dural tension may be accomplished usually by one of four procedures having for their purpose the withdrawal of cerebrospinal fluid, viz., ventricular puncture, lumbar puncture, tapping of the posterior median cisterna, and the gradual withdrawal of fluid between the meninges through a minute opening in the dura. Of these procedures, ventricular puncture has perhaps the greatest field of usefulness; it is made either through the operative field or through a separate opening in the skull. For the relief of tension over the cerebellum, the posterior cornu of either lateral ventricle is tapped through an opening in the skull a little above the transverse sinus and 1·5 cm. from the mid-line.

Operability of Brain Tumours.—It should not be forgotten that, in speaking of the operability of brain tumours, we are dealing, for the most part, with malignant tumours, and that, because of anatomical and clinical difficulties, our chances of cure by surgical means are less than in malignant tumours elsewhere in the body.

Although our chances of a cure by extirpation of the tumour are at present few, practically every operation may be converted into a palliative procedure: and in fully 50 per cent of all cases we may

confidently expect an amelioration or total disappearance of pressure symptoms and a subsequent comfortable existence.

Transplantation of Fascia.—The transplantation of fascia lata has been a helpful procedure. Most ideally it has been used to cover large dural defects left after the removal of tumours that have arisen from, or have been firmly attached to, this membrane ; or in cases in which both dura and bone flap have had to be removed.

In the analysis of a case of tumour of the third ventricle, Clarke and Lhermitte[2] call attention to a group of symptoms more or less characteristic of pressure in the region of the hypophysis and infundibulum, and which they term the *syndrome infundibulaire*. This is characterized by visual disturbances—e.g., bitemporal hemianopsia, —transitory dysarthria, and psychic manifestations—delirium, mental confusion, and narcoleptic seizures: circulatory disturbances, such as tachycardia, arrhythmia, extrasystole, and fœtal rhythm may occur, as well as polyuria and polydipsia. They believe that the ventral region of the third ventricle contains centres which have some regulatory action on the vegetative nervous system.

References.—[1]*Johns Hopkins Hosp. Bull.* 1916, Aug., 224; [2]*Presse Méd.* 1917, July 23, 417.

BROMIDROSIS. (*See* Hyperidrosis.)

BRONCHITIS. *Arthur Latham, M.D., F.R.C.P.*

Galli-Valerio[1] states that *spirochæte bronchitis* has been encountered in Ceylon, India, the Philippines, Europe, and elsewhere, since Castellani called attention to it. Galli-Valerio has had seven cases in his practice at Lausanne. The prognosis is favourable if the treatment is energetic enough to arrest the disease before it has passed into a chronic phase. Microscopic examination of the stained sputum reveals the spirochætes. In treatment, he advises rest in bed, keeping up the patient's strength, and giving **Arsenic**, either by Fowler's solution by the mouth, or intramuscular injection of **Sodium Cacodylate.** He also recommends **Salvarsan.** The disease runs an acute course in five or six days, with high fever and profuse expectoration of a whitish or yellowish sputum. Percussion shows no change, and auscultation reveals merely disseminated râles. Headache, pains in the limbs, reduction in hæmoglobin and red cells, with manifest leucocytosis, are other features. The chronic form is accompanied by a hectic fever deceptively like that of tuberculosis, chronic cough and expectoration, and sometimes actual hæmoptysis, with much weakness and anæmia. Untreated, it may drag along for years, with intervals of improvement.

Coleman's investigations into the action of **Ammonium Chloride** on the bronchial secretion (p. 3). **Garlic** as a stimulating expectorant (p. 15).

Reference.—[1]*Cor.-Blatt. f. Schweiz. Aerzte*, Feb. 10, xlvii, No. 6, pp. 161-92.

BRONCHOPNEUMONIA IN CHILDREN.

Frederick Langmead, M.D., F.R.C.P.

J. E. Measham[1] gives in detail his treatment of this condition as it occurs in young children, in whom the mortality is usually high. The child's chest is enveloped in a light Gamgee jacket, over which a pair of woollen combinations is worn. The bed is placed in a part of the room free from draughts, and no more than the usual bedclothes is allowed. A fire is kept always burning, and the window remains open. The child is encouraged to take sips of cold water frequently. The novel feature is that no medicines are given by the mouth, but a subcutaneous injection of **Quinine Hydrochloride** is administered morning and evening. A solution is prepared in which 1 gr. of the salt is dissolved in 10 min. of water, and the dosage is as follows: For a child under six months, 5 min.; for one under one year, 10 min.; between one and two years, 15 min.; over two years, 20 min. Of 17 cases so treated, 12 of which were under three years and 10 under two years, 2 only were fatal. In one case death was due to Bright's disease, so that the mortality from pneumonia alone was very small. The other fatal case was not seen until the seventh day of the disease. He states that the physical signs disappear rapidly.

Reference.—[1]*Pract.* 1917, i, 581.

BRONCHOSCOPY. (*See* Laryngoscopy, Etc.)

BURNS.

W. I. de C. Wheeler, F.R.C.S.I.

The treatment of burns by paraffin wax has received considerable attention during the past three years. From a study of the literature it would appear that good results are only obtained by those who pay special attention to the small details of technique. Henry Hunt[1] describes the treatment of burns by **Ambrine.** This is a mixture of wax and resin—solid when cold, but as fluid as water when heated to 70° or 80° C. It can be sterilized in any receptable by heating to 125° C. It is analgesic, and although applied at a temperature of 60° or 70° C., does not burn the tissues. It may be either sprayed on the wound or applied with a soft brush. When the ambrine is applied, a thin layer of cotton-wool pulled out in the form of a web is laid over it, and this in turn is painted over or sprayed with a second layer of the wax. The ambrine can be removed with wet swabs, and then should be re-applied.

Belney[2] recommends the following formula as a substitute for ambrine: Paraffin (melting point 40° C.) 87 per cent, beeswax (yellow) 10 per cent, white resin (turpentine) 3 per cent. In preparing the material, the resin is heated to melting-point; to this is slowly added the wax, and finally the paraffin. The original ambrine was applied in three layers: (1) a layer of waxy substance directly upon the burned surface, (2) a thin layer of absorbent cotton, (3) a second layer of wax. Belney recommends thorough cleansing of the wound with sterile water. After drying, the wax is applied with a soft

camel's-hair brush, the thinnest layer of absorbent cotton obtainable, and then a second layer of wax is painted on. Ordinary dressings are then applied, and the process is repeated every twenty-four hours. He comes to the following conclusions: (1) A preparation of paraffin, wax, and resin is as good as ambrine and comparatively inexpensive; (2) Applied as outlined it makes a comfortable dressing which can be removed without causing pain: (3) It relieves pain and diminishes shock; (4) It enables the patient to become ambulatory earlier: (5) It lessens toxic absorption from burns involving large areas, and does not cause sepsis; (6) It promotes the separation of the devitalized tissues; (7) It minimizes the formation of scars and contractures; (8) It should be applied as soon as possible for the first dressing, and used for all subsequent dressings: (9) After healthy granulations have been obtained, it is advisable to hasten epidermal proliferation by grafting; (10) The use of silver nitrate is always undesirable.

Emerson[3] does not speak so highly of the wax-paraffin method. He thinks that in certain types of second-degree burns it is about as good as any other dressing, and that the wax film is a good addition to the various methods of treating denuded surfaces and burns, but not a cure for all types of injury.

References.—[1]*Jour. R.N. Med. Service*, 1917, July, 296; [2]*N. Y. Med. Jour.* 1917, Aug. 18; [3]*Jour. Amer. Med. Assoc.* 1917, ii, 271.

CEREBRAL TUMOUR. (*See* Brain, Tumours of.)

The value of **X-ray** findings discussed (p. 51).

CEREBROSPINAL FEVER. *E. W. Goodall, M.D.*

In a paper on "The Origin and Prevention of Cerebrospinal Fever," H. Sutherland[1] brings forward certain statements in support of the view that air-borne meningococcal infection can only occur in a warm saturated atmosphere, and is impossible in cold air. Meningococci die quickly at low temperature (60° and below). It is true that epidemics of the disease are met with more frequently in cold than warm weather; this is explained by the conditions under which so many persons live in cold weather: the cutting off of cold air by insufficient ventilation, aided sometimes by overcrowding. In summer the air, though warmer, is less saturated with moisture than in winter. When warm saturated air is inhaled, the nasal mucosa becomes swollen, congested, and covered with thick secretion, the activity of the ciliated cells is reduced, and phagocytic action in the lymphoid tissues is diminished. This means a lowered local resistance to any bacterial infection present in the nasopharynx. The author relates facts concerning the improvement as regards the incidence of cerebrospinal fever and certain respiratory diseases in ill-ventilated barrack-rooms, by carrying out measures designed to ensure efficient ventilation.

P. Sainton[2] draws attention to certain rare forms of this disease.

In one an early symptom is an erythema, scarlatiniform or morbilliform. There is also invariably present inflammation of one or more joints. Aspiration of these joints yields a purulent green fluid in which meningococci can be found. In some instances a purpuric rash may be one of the first symptoms, without any sign of meningitis. This form is described also by Netter (in paper quoted below). Very rarely cerebrospinal fever may commence with arthritis, of one or of several joints.

In discussing the pathology, both R. Donaldson[3] and Rosenberger and Bentley[4] state that organisms other than the meningococcus are occasionally found. While some of these organisms are due to contamination of the cultures or of the fluids examined, others are considered to be introduced by natural paths, whatever they may be. Amongst these organisms, streptococci, the pneumococcus, and diphtheroid bacilli are found. The latter are regarded by Donaldson as secondary invaders; and Rosenberger and Bentley consider them to be contaminating organisms.

In discussing the diagnosis, H. D. Rolleston[5] writes as follows: "Cerebral symptoms (meningitis) accompanying acute infections, such as influenza, pneumonia, enteric, otitis, malaria, may closely imitate cerebrospinal fever, and a certain diagnosis can be made only by lumbar puncture and examination of the cerebrospinal fluid. Even if a patient has signs of pneumonia it is possible, as shown by isolated cases in both the recent epidemics in the Navy, that there is meningococcic meningitis as well.

"From other forms of meningitis lumbar puncture and examination of the cerebrospinal fluid constitute the most reliable method of diagnosis. Even with pre-existing otitis it does not necessarily follow that meningococcic meningitis can be excluded; for . . . in five cases (four fatal), meningitis, in which the cerebrospinal fluid was proved bacteriologically to contain meningococci, supervened on otitis.

"Difficulty might arise in the diagnosis from the meningitic form of acute poliomyelitis, in which all the symptoms of meningitis may be present, but 'on lumbar puncture the cerebrospinal fluid escapes under pressure, is clear, and on cytological examination may be found to contain an increased number of lymphocytes, with a normal or sometimes a diminished sugar reaction, and an increased amount of albumin' (Batten)."

T. R. Elliott and H. W. Kaye[6] report two cases of *purpura* in meningococcal infections. In commenting upon them they write as follows: "Several medical officers have met with fulminating and rapidly fatal cases of fever associated with a purpuric rash, which were proved to be due to a meningococcal septicæmia: and this experience is so well known that the suspicion of a meningococcal infection is always raised now in the minds of clinicians when they have to deal with a case of fever that exhibits a petechial or purpuric rash, even though no symptoms of meningeal inflammation can at

first be detected. We are not aware of any evidence which shows clearly whether these spots on the skin are to be regarded as a toxic rash or as a foeal eruption caused by the local development of colonies of meningococci that had been distributed in a septicæmia. Blood cultures have not been systematically made by workers from cases of cerebrospinal meningitis with a rash." Unfortunately cultures from the purpuric eruption were not made in the two cases reported. As bearing on this point, three cases published by A. Netter, M. Salanier[7] and Mme. Wolfrom[8] are of great interest, because they were cases of purpura in meningococcic infection in which the hæmorrhagic cutaneous lesions were examined for the meningococcus with positive results. In two of the cases there were no, and in the third only slight, meningeal signs, at any rate while the patients were under observation. Two of the cases were rapidly fatal, and probably also the third. One of Elliott and Kaye's cases died within twenty-four hours from the onset, without definite symptoms of meningitis, but the diagnosis of meningococcic infection was made on the blood, the cerebrospinal-fluid, and post-mortem examinations. In doubtful cases of purpura, therefore, it is advisable to make examinations of the eruption without delay, as thereby an early diagnosis may be arrived at. The findings in the three cases reported by the French observer go to show that purpura in meningococcal infection is of foeal origin.

On the subject of purpura in cerebrospinal fever, a paper by Netter may also be referred to.[9]

R. J. Reece[10] reports five cases of rapidly fatal *anthrax* in which a diagnosis of probable cerebrospinal fever was made. While there were cerebral symptoms in all of the five cases, in only two did they at all resemble those met with in the usual form of cerebrospinal meningitis; rather were they of the type seen in cases of severe septicæmia, whatever the cause. In all the cases, however, anthrax bacilli were recovered from the cerebrospinal fluid. In two only of these cases was the brain examined post mortem. In one the meninges were described as being 'congested with dark fluid'; in the other they were congested and there was much extravasated blood filling the subarachnoid space. The cases appear to have been rapidly fatal general infection with *Bacillus anthracis*. In one case it was probable that infection had been derived from a shaving-brush.

According to W. H. Parkes,[11] the spread of cerebrospinal fever has been successfully controlled amongst the reinforcements proceeding from New Zealand to England during the last few months of 1916, by the treatment of carriers and contacts by an apparatus similar to that described in last year's ANNUAL (p. 146). "A disinfectant solution is sprayed into the air of a room of 700 cubic feet capacity, the steam atomizing from a vessel containing 1 per cent solution of **Zinc Sulphate,** of which 1 litre suffices for twenty minutes. Eight carriers are treated for five minutes in the prone position, inhaling the misty air through the nose; this temporarily destroys

the meningococcus in the nasopharynx. The inhalations are repeated daily for three, four, or five days, until the results of the swab are negative." Cases of the fever had been frequent on the transports before this method was adopted, afterwards there were none.

The following observations are quoted from a paper by C. Worster-Drought[12] on treatment by **Serum** given intrathecally, and **Vaccines.** There were sixteen cases, with five deaths, a fatality of 31 per cent. The prognosis depends greatly upon the stage of the disease at which the specific treatment is begun. In a suspected case, if at the first lumbar puncture the fluid shows any turbidity, it is advisable to administer the serum at once without waiting for the bacteriological examination. The serum used and advised was the Lister Institute polyvalent serum (1916), prepared from various strains of the 1915 epidemic. The dose is 30 c.c., and this should be repeated daily for four days, even if improvement has been noted on the second or third day. When less than 30 c.c. of cerebrospinal fluid has been withdrawn, the amount of serum injected should be 5 c.c. less than that quantity. When the improvement is decided at the end of four days, no more serum need be given, but **Lumbar Puncture** should be performed daily until the fluid is clear to the naked eye. But if there is no improvement, or if the symptoms recur, or the fluid again becomes turbid, serum should be resumed as at first. Fluid should be withdrawn by lumbar puncture until it runs out at the rate of one drop in five seconds. Very seldom is a general anæsthetic required. The serum is preferably run into the spinal canal by gravity, and not by injection with a syringe. The patient may complain of cramp during the administration of the serum; this will be relieved by directing him to breathe deeply with a somewhat long inspiration and short expiration. When the injection is completed, the foot of the bed should be raised for an hour to facilitate the upward flow of the serum. If any pain in the back and legs is complained of subsequently, 10 to 15 gr. of **Acetylsalicylic Acid** usually gives relief.

The author recommends **Vaccine** in larger doses than are usually employed; 250 million organisms should be injected subcutaneously at the time of the first administration of serum; vaccine is continued every fourth day, the second dose being 500 million, and each of the subsequent doses increased by 500 million up to a maximum of 2500 million. Preferably an autogenous vaccine should be used, but as this usually takes some time to prepare, a polyvalent vaccine from the prevailing strains should be used at first, and an autogenous vaccine employed as soon as it can be prepared. If the reaction to a certain dose is at all pronounced, the same dose is repeated four days later, usually without a reaction, and the increase of 500 million is not made then, but at a subsequent dose. Vaccines are useful in protracted cases.

As regards other adjuvant remedies, **Sulphonal** is recommended in 25-gr. doses to promote sleep, and dilute **Hydrocyanic Acid** to allay

vomiting. **Morphine** should be given in extreme restlessness and sleeplessness. Fresh air is of great importance ; if the weather is suitable, patients should be taken out of doors.

T. D. Halahan[13] reports successful results (nineteen cases with only two deaths) with the following treatment : **Lumbar Puncture** as early in the case as possible, with liberation of 50 to 70 c.c. of cerebrospinal fluid, followed immediately by free washing out of the spinal canal with ½ per cent solution of **Carbolic Acid** in normal saline solution, and then by the injection of 10 to 30 c.c. of **Serum** specific for the prevalent strains of the meningococcus. The treatment should be repeated daily as often as may be necessary.

References.—[1]*Lancet*, 1916, ii, 828 ; [2]*Med. Press and Circ.* May, 1917, 367 ; [3]*Pract.* 1917, i, 436 ; [4]*N. Y. Med. Jour.* 1917, ii, 60 ; [5]*Jour. R. N. Med. Service*, 1917, Jan., 1 ; [6]*Quart. Jour. Med.* 1917, July, 361 ; [7]*Brit. Jour. Child. Dis.* 1917, April-June, 101 ; [8]*Ibid.* 104 ; [9]*Rev. de M d.* 1916, March, 133 ; [10]*Lancet*, 1917, i, 406 ; [11]*Brit. Med. Jour.* 1917, i, 262 ; [12]*Ibid.* 1916, ii, 689 ; [13]*Lancet*, 1916, ii, 1102.

CEREBROSPINAL FLUID. (*See* Lumbar Puncture.)

CHEST, WOUNDS OF. *Arthur Latham, M.D., F.R.C.P.*

T. R. Elliott[1] gives some statistical results of the treatment of chest wounds, and formulates the following practical conclusions :—

1. A sterile hæmothorax of moderate size, that is, of about 30 oz.. will recover as rapidly by natural absorption as by aspiration.

2. The retention of foreign bodies in the chest in aseptic cases does not appear to exert any crippling effect for military service ; but more accurate information is urgently needed on this point.

3. Cases of infected hæmothorax that have been drained in France and transferred to the United Kingdom generally recover rapidly and completely. None die, and subsequent operations are rarely needed. More than one-half of these empyema cases can be returned to duty.

4. The late mortality from chest wounds is practically nil in England, and it is only 5 per cent on the lines of communication in France ; but in the area of the armies it is higher than was at first supposed. About 10 or 15 per cent may die in medical units at an early date from the severity of the injury, and about 10 per cent may die later at the casualty clearing station from complicating sepsis.

5. Among those casualties which develop sepsis within the chest the mortality is very high, rising to nearly 50 per cent under the present system of treatment by rib resection and drainage.

6. The old conservative routine of surgical non-intervention, except by late drainage, finds its justification only in the satisfactory recovery of the cases of gunshot wound of the chest which remain non-infected, that is, about 75 per cent. The high mortality in those which develop sepsis demands a wider practice of the new prophylactic method of cleansing operations, performed at an early hour on certain carefully chosen groups of cases.

Sir John Rose Bradford,[2] in dealing with the treatment of *hæmo-*

thorax, points out the necessity of a bacteriological examination of the fluid, and says cases occur in which the fluid is at first sterile, but later becomes infected. In all cases of hæmothorax in which the bacteriological examination reveals the presence of pathogenic organisms, he advises the **Excision of a Portion of Rib** and the establishment of free drainage. In some cases the Carrel-Dakin technique is required in addition.

A. B. Soltau and J. B. Alexander,[3] in a paper on gunshot wounds of the chest as seen at a base hospital in France, advise **Aspiration** or, if necessary, surgical interference in hæmothorax when the effusion is large enough to embarrass the heart; but in smaller effusions they do not advise interference unless absorption is delayed. In this case they recommend aspiration with oxygen replacement. In septic wounds of the chest there is only one line of treatment, namely, resection of part of a rib and the establishment of free drainage. In the case of foreign bodies their practice is to remove those localized by *x* rays as being near the surface, but not until the lung condition has cleared up. 'Deep' foreign bodies are best left alone unless indications of focal infection appear. As a general routine in all cases of lung wounds, antitetanic serum is given each successive eighth day until healing is well in progress.

References.—[1]*Lancet*, 1917, ii, 371; [2]*Brit. Med. Jour.* 1917, ii, 141 [3]*Quart. Jour. Med.* 1917, July, 259.

CHOLERA. *Sir Leonard Rogers, M.D., F.R.C.P.*

B. C. Crowell and J. A. Johnston[1] have made bacteriological examinations of the contents of the intestines and of the gall-bladder. Out of 210 cholera cases, the vibrio was isolated from the intestine in 93·7 per cent, and from the gall-bladder in 59·5 per cent; but among 32 cholera-carriers detected post mortem the organism was present in the intestine in 56·2 per cent and in the gall-bladder in 75 per cent. O. Schobl and C. S. Panganiban[2] found specific immune bodies in the blood of experimental cholera-carriers, but not in the normal bile of a highly immunized rabbit. Preventive vaccination and vaccine therapy did not shorten the duration of cholera-carriers in guinea-pigs. O. Schobl[3] found in experimental cholera-carriers fed on ox-bile that cholera vibrios were more frequently and constantly present in the alimentary canal. H. G. Gibson[4] describes a new solid medium for the isolation of cholera vibrios, based on the fact that of intestinal organisms they only acidify starch. It contains 0·15 per cent sodium bicarbonate and litmus, and after eighteen hours the cholera vibrio colonies alone show a faint pink colour.

E. D. W. Greig[5] describes minute details of differences between the morphological and cultural characters of different strains of cholera-like vibrios, and also[6] the results of feeding experiments with the same organisms in rabbits, showing that they may have a varying degree of virulence. The same worker[7] records the results of examination of the stools in 659 cholera cases in Calcutta during three years,

Dieudonné's medium being used. The standard cholera vibrio was found in 81·2 per cent, cholera-like vibrios alone in 7·75 per cent, and neither in 11 per cent, mostly in late admissions. Greig[8] also deals with the very technical subject of serological studies.

G. G. Turner,[9] in experiences in Mesopotamia, reports considerable success in the treatment of cholera by **Hypertonic Saline,** and states that any want of success is probably due to the careful directions of the author of the method not having been carried out.

References.—[1]*Philadel. Jour. Sci.* Sect. B, 1917, March, 85; [2]*Ibid.* 43; [3]*Ibid.* 1917, Jan., 23; [4]*Brit. Med. Jour.* 1916, ii, 454; [5]*Ind. Jour. Med. Research,* 1917, July, 81; [6]*Ibid.* 89; [7]*Ibid.* April, 651; [8]*Ibid,* 658; [9]*Brit. Med. Jour.* 1917, ii, 35.

CHOREA. *Frederick Langmead, M.D., F.R.C.P.*

I. A. Abt and A. Levinson[1] have made a critical survey of 226 cases, which comprise all those treated in a children's hospital since 1880. The frequency of chorea was about 2·2 per cent of all the children treated at the hospital during that time. The age incidence ranged from three and a half to eighteen years, the disease occurring most frequently between the ages of five and fourteen. The ratio of females to males was 2 to 1. Season did not play a constant rôle: the greatest number was observed in December and January, the smallest in October. In their patients the relationship between chorea and rheumatism was ill-defined. Only 13 had a definite history of rheumatism, whilst 130 had no history of rheumatism. They acknowledge, however, a belief in this relationship, although not borne out by the cases. [Perhaps this is explained to some extent by too narrow a view of what constitutes rheumatism at the time when the histories of the cases were taken.—F. L.] Tonsillitis was not a prominent feature, for 66 per cent had no history of it. Infectious diseases were found to precede the onset of chorea in many cases, but they seemed to bear no close relationship to it. Syphilitic manifestations were present in 2 cases only, and appeared to be unconnected with the chorea. Localization was frequent, many cases having signs more marked on one or other side. Endocarditis was frequent but not constant. The mortality was less than 1 per cent. The duration of the disease varied from one day to over a year; the average was from two to eight weeks. Recurrences took place 35 times. One patient had four recurrences, 4 had three, and 20 had two. The method of treatment had no direct bearing on the recurrences. They strongly favour rest in bed and complete **Isolation, Baths,** and **Salicylates.** They do not believe that arsenic has any special effect upon the disease, but consider that if given in too large doses it may be detrimental.

In the discussion which followed, H. F. Helmholz stated that of 138 cases, 33 per cent had a history of repeated tonsillitis, 21 per cent of rheumatism, 26 per cent of endocarditis, 8 per cent of rheumatism and tonsillitis, 21 per cent of rheumatism and endocarditis; and 54 per cent of the entire group showed one or other of these

manifestations. A. Jacobi also believes that rheumatism, chorea, and endocarditis bear a very close relationship, and that the rheumatism, which comes first, is often overlooked.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1916, ii, 1342.

CLEFT PALATE. *J. S. Fraser, M.B., F.R.C.S.*

Mitchell[1] states that surgical closure of the cleft is the ideal method of treatment when it is possible to restore the function of the tissues. The closure of the cleft, however, even if surgically successful, unless it restores the functions of the tissue, invariably leaves the patient worse off than before. With the vomer and the soft and hard palate missing, one can readily see the impossibility of shaping the resonating chambers to produce the proper sounds. In Mitchell's method (*see Figs.* 13, 14, 15) the missing hard palate and vomer are reproduced in hard rubber, and fastened rigidly to a supporting metal plate, which is firmly clasped to the teeth. This restores the nasal passages as well as the roof of the mouth.

Fig. 13.—Plaster cast in a case of cleft palate. Showing absence of vomer, hard and soft palate.

Fig. 14.—Appliance in position on model.

Fig. 15.—Side view of appliance.

The soft palate, however, is the most important organ concerned in shaping the resonance chambers. To replace this in the artificial

plate, a movable flap (also made of hard rubber) is attached to the posterior border of the artificial hard palate by means of a specially constructed hinge. It is shaped to fit the cleft, and has thin flanges on either side to rest upon the upper surfaces of the remaining palatal tissue. The appliance restores only the mechanism; improvement in voice and speech comes through persistent co-operation of the patient and instruction by a thoroughly competent teacher.

REFERENCE.—[1]*Amer. Jour. Surg.* 1917, March, 57.

COLITIS, ULCERATIVE OR SUPPURATIVE.

Robert Hutchison, M.D., F.R.C.P.

Ehrmann[1] regards this as a surgical affection because first described by surgeons. It was later thought by physicians to be quite distinct from dysentery. In 1914 Ad. Schmidt pronounced it an affection *sui generis*. Nevertheless the picture has been seen in dysentery, tuberculosis, syphilis, mercurial poison, paratyphoid, food poisoning, etc. The author has seen a number of cases of severe colitis with discharge of blood and pus, and has been forced to the conclusion that it is not a disease entity. In one case the observation was defective (no autopsy). In a second the autopsy findings were those of dysentery, but no positive agglutination tests were obtained. The case had been so severe that a colostomy had been done. In a third case agglutination was obtained with atoxic exciters of dysentery (Flexner and Y). A fourth case was post-dysenteric with positive agglutination, and in three others the latter was also present. These cases were all surgical in type, and the rectoscope showed the presence of such a degree of tumour-like excrescence that the possibility of cancer had to be borne in mind. Collections of pus co-existed in some cases, and when one of these ruptured there was a notable escape of pus in the stools. The chronic course of this affection is usually responsible for the fact that the physician sees it only in an advanced stage. We should no longer work to isolate a special malady, but study the conditions under which the picture appears. Recent cases represent a gain here, and the author has seen one during the past six months. The patient, a medical man, was subject to attacks of diarrhœa, one of which was present when he was first seen. A little blood was passed with each stool. The rectoscopic findings were those of ulcerative colitis. No dysentery bacilli or other pathogenic organisms were found in the stools, but the blood agglutinated the Flexner and Y organisms. The patient had been active throughout the illness, and a physician had termed the latter hæmorrhoids.

Surgical treatment must be undertaken with the knowledge that the entire colon, from valve to anus, is involved. A sigmoid anus is contra-indicated, and only a **Cæcal Anus** or **Appendicostomy** permitted. Constant irrigation through the latter is the only guarantee against stricture. In conclusion the author regards this affection as practically a chronic dysentery, which will be common after the war. Atoxic or so-called pseudo-dysentery is a variable condition manifested

now as a simple chronic catarrh, now as dysentery of the severest type with secondary infection.

Lynch and McFarland,[2] as a result of the study of several cases, believe that there is a type of acute purulent and hæmorrhagic inflammation of the colon that cannot be attributed to any specific organism. These cases are of sudden onset, with the passage of blood and pus. The stools are often extremely fœtid, and there may be profound constitutional disturbance. For treatment, these authors much prefer making a **Stoma in the Small Intestine** to a mere appendicostomy. They maintain that the old idea that a patient with a stoma in the ileum would waste rapidly is fallacious.

References.—[1]Abst. in *Med. Rec.* 1917, i, 252 ; [2]*Jour. Amer. Med. Assoc.* 1916, ii, 943.

COLON, DILATATION OF, IN CHILDREN.

Frederick Langmead, M.D., F.R.C.P.

Megalocolon, as A. Peskind[1] points out, whether congenital, or resulting from stenosis or volvulus of the sigmoid, or from colitis, etc., is chronic, progressive, and incompatible with good health. The condition may, however, persist for many years.

Symptoms.—Chronic colonic stasis is the most prominent symptom, and results in progressive malnutrition. Emaciation is not infrequent, the skin in severe cases becoming shrivelled and dry unless a slight œdema supervenes. There is seldom much vomiting ; when this symptom is present it is unaccompanied by nausea or distress, but is regurgitant in character. Appetite is more often excessive than impaired, and thirst is great. The abdomen gradually increases in size, in contrast with the general wasting. In very advanced cases the child looks old and cadaverous. The proctoscope reveals an enormously distended lower sigmoid, usually packed with remnants of undigested food and detritus of intestinal mucosa. There may be eight or ten motions a day without apparently lessening the contents of the colon.

Radiograms demonstrate best the size of the colon. The transverse diameter alone may be increased, or the bowel may also appear enlarged longitudinally, convoluted, and twisted upon itself in various places, especially in the lower region of the sigmoid flexure.

Treatment.—In spite of these appearances it is a medical disease, for the therapeutist can cope successfully with the chief disturbing element—the colonic stasis and the putrefactive and toxic processes caused by it. Rest in bed and judicious regulation of **Diet** are the first requisites. **Intestinal Lavage** with a large rectal tube—not a small catheter—must be resorted to several times daily until the colon is fairly well emptied. Easily digestible foodstuffs, or such as are predigested, must be substituted for the previous diet. Milk should be prohibited altogether at first. Eggs, meat juice, and starchy food, to which some **Diastase** is added, will provide a food of which little residue remains by the time it reaches the colon. A

mild laxative may be required occasionally, but should be used with great caution. At the beginning of the treatment there is usually loss of weight, partly due to the removal of the accumulation in the colon, partly to absorption of œdema from the tissues. The loss of weight may be considerable, but is soon recovered from, being replaced by a gain, while the abdomen is perceptibly diminishing. The treatment must be persevered in for a long period.

Notwithstanding the favourable results obtained in the majority of cases, there are others for which a simple and safe operation is necessary to save the child's life. **Cæcostomy** and **Appendicostomy** are the only operations to be tried upon children before an attempt is made to remove the colon—an operation very seldom indicated in children. These afford a means of keeping the colon clean, for it is quite easy to wash the colon through the fistula with a weak solution of **Sulphate of Magnesium** or of **Bicarbonate of Soda,** of **Peroxide of Hydrogen,** or at times with some **Oil.** Each washing through the fistula must be followed by rectal lavage with a similar solution to prevent the injected fluid remaining too long in the colon. The injections must be continued for weeks, perhaps for months. The dietetic and oral treatment must be continued.

Reference.—[1]*Med. Rec.* 1917, i, 1089.

CONSTIPATION. *Robert Hutchison, M.D., F.R.C.P.*

Einhorn[1] prefers the term 'constipation with nervous symptoms' to 'intestinal stasis,' as it describes the condition equally well without committing one to a definite theory. He believes that the nervous symptoms are the results of a failure of the bowel to eliminate poisons rather than to an auto-intoxication by absorption from the colon. He outlines the treatment as follows: Instead of frightening the patient with auto-intoxication theories, he must be assured that *no* harm will result from the lack of a bowel movement for a few days. He must be instructed to go to the toilet every morning at about the same hour, and not to think or worry about the bowels during the rest of the day. Nerve sedatives are occasionally helpful. Ample food and a great variety of it should be given. Vegetables, fruits, and salads should play a prominent part in the dietary. Water should be taken liberally at meals, and also between meals. If these measures alone are not sufficient, mild aperients may be employed, as, for instance, **Cascara Sagrada, Rhubarb, Phenolphthalein,** etc. **Agar-agar** helps to lubricate the fæcal matter, and is in itself useful in facilitating bowel peristalsis. Phenolphthalein-agar and rhubarb-agar act especially well, and can be used profitably for long periods of time. **Olive Oil** and **Liquid Petrolatum,** in tablespoonful doses, taken when arising and retiring, are likewise beneficial. Cases in which abnormal conditions with regard to gastric secretions or to position of stomach and bowel exist have to be managed according to the generally known principles. This alone will frequently be of help in overcoming the constipation. **Saline Enemas,** likewise injections into the

bowel of a small quantity of olive oil or water at bedtime—to be retained over night—are helpful in restoring the bowel function. **Abdominal Exercises, Massage** of the abdomen, **Electricity** applied percutaneously over the abdomen, or one electrode over the abdomen and the other in the rectum, are likewise beneficial measures which can be resorted to in obstinate cases. Operations are seldom, if ever, required.

Bolton[2] strongly recommends **Abdominal Kneading** as a method of treatment in intestinal stasis. The patient, after being carefully instructed, can carry out this treatment for herself. Lying in a warm bed, in a comfortable position on the back, so as to relax as far as possible the abdominal muscles, she must place both warm hands, with the fingers flat, upon the abdomen over the position of the cæcum. Gentle but firm pressure must now be made, gradually getting deeper and deeper as the muscles relax and the contents give way. The pressure must be made backwards and upwards, and must be continued at this spot for at least two minutes. The contents cannot be easily driven back into the small intestine, and will therefore be impelled forward. The hands, still pressing deeply, are made to follow the contents up the line of the ascending colon.

The next movement has for its object to assist the passage round the hepatic flexure. For this purpose the fingers of the right hand are placed at the right loin, in the cleft between the lower ribs and the hip-bone, and pressed firmly forward. The left hand is placed at a corresponding spot on the front of the body, and pressure brought to bear so that the bowel is squeezed between the two hands and emptied of its contents. The pressure may be relaxed and repeated several times. The gall-bladder must now be manipulated. The tips of the fingers of both hands are forced under the ribs at the position of this viscus, and pressure is brought to bear upon the fundus. A very efficient instrument for this treatment of the gall-bladder is the electric vibrator.

Deep kneading is now applied over the transverse colon, pressing towards the spleen. The splenic flexure is treated in the same way as the hepatic, but it is far less important. Indeed, the only other important part to treat is the sigmoid flexure, and here the pressure must be exerted downward. The patient should treat herself after getting to bed at night, and again before rising in the morning, spending fifteen to twenty minutes in the process. Steady pressure and great patience are necessary if any success is to be obtained. Much of the treatment recommended can be carried out by the use of a heavy ball of shot, which is very slowly rolled over the abdomen following the direction of the large intestine.

The most obvious effect of the kneading is the passage of flatus which usually occurs while the treatment is in progress, and this is frequently followed later on by an action of the bowels.

In elderly persons in whom the tone of the muscular fibre is lost, difficulty is experienced in bringing about a healthy action of the

bowels ; they suffer from chronic retention, and when the bowels are relieved by purgatives there is inability to retain the liquid motion. For these cases abdominal kneading with electricity is useful.

Many persons in ordinary health are subject to occasional attacks of heaviness or depression. They arrive at their office only to find that the head is not clear and work is an effort. Let them lie on a couch and carry out abdominal kneading. In the course of an hour the head will become clear and all the unpleasant depression pass away. Early morning headache is caused by poisons absorbed from the abdomen, and is relieved by kneading, even when there is no constipation. Diarrhœa is due in many cases to fermentation in the cæcum. The overflow gives the mistaken impression that there is no stasis. Kneading is often of service in this condition. No case of mucous colitis should be considered incurable until kneading has been thoroughly tried, while paraffin is being given internally.

Apocodeine a useful laxative (p. 4).

References.—[1]*Med. Rec.* 1917, i, 847 ; [2]*Brit. Med. Jour.* 1917, i, 422.

CONVULSIONS IN CHILDREN.

Frederick Langmead, M.D., F.R.C.P.

Collin and Revon[1] hold that the prognosis depends exclusively upon whether the convulsions are merely evidences of an over-excitable nervous system or are the initial symptoms of meningeal or brain disease. This, they say, can be determined by the form of the spasms. Clonic spasms are benign, tonic are of graver import. Clonic spasms occur as the result of an inherited neuropathic or alcoholic taint. They are an episode of a predisposing state, not heralds of organic disease. In predisposed children the spasms may be induced by various mechanical, toxic, or physical causes of cell-stimulation. They are the expression of the infantile spinal type, and therefore evidence of medullary stimulation, not of cortical. Clinically they are bilateral.

Tonic convulsions, on the other hand, may occur at any age, and are expressions of some actual lesion of the cell. They may affect anyone with an infection involving nerve centres, and are produced by any mechanical or physical, toxic or infectious process which modifies the histological structure of the cell. The subsequent history of children suffering from tonic spasms differs entirely from that of those whose convulsions are of the benign clonic type. The latter are neuropaths, and will present symptoms, more or less often, which do not correspond to any known pathological anatomy. Those who have tonic convulsions develop hemiplegia or epilepsy, or succumb to meningitis or encephalitis, and in nearly all cases morbid processes can be discovered by microscopical examination. If a tonic phase occurs, both the immediate and remote prognosis should be reserved.

The article is based on a protracted study of 80 cases, of which only 17 were of the clonic type. These were generally older children, and it usually transpired that other children of the family had had

convulsions. The reflex convulsion causes merely clonic movements without associated symptoms, and it is thus possible to determine the prognosis from the first convulsion.

Reference.—[1]*Arch. de Méd. des Enf.* 1917, No. 6. 281 (abstr. in *Jour. Amer. Med. Assoc.* 1917, ii, 411).

CORNEAL ULCERS. (*See* Eye Affections.)

COUGH (PAROXYSMAL) AND THE LINGUAL TONSIL.

J. S. Fraser, M.B., F.R.C.S.

Mark Hovell[1] lays stress on the part played by enlargement of the lingual tonsil in the production of paroxysmal cough. After influenza or a simple 'cold,' paroxysmal cough is frequently due to an enlarged lingual tonsil coming into contact with the epiglottis. A solution of **Chloride of Zinc,** 15 to 30 gr. to the ounce, is in many cases sufficient to remove the trouble. The best remedy, however, is **Trichloracetic Acid,** applied on a wool-holder bent at a right angle. A mirror should be used so that the acid may be placed accurately on the swollen tissue.

Reference.—[1]*Brit. Med. Jour.* 1916, ii, 692.

CRANIAL SURGERY. (*See also* Skull, Gunshot Wounds of.)
Value of **X Rays** in diagnosis (pp. 49–51).

CYCLITIS. (*See* Eye Affections.)

CYSTS OF DENTAL ORIGIN. *W. H. Dolamore, M.R.C.S., L.D.S.*

Wohl[1] proposes that cysts of the jaws should be classified thus: (*A*) Inflammatory; (*B*) Tooth germs (chorioblastomatous): (*a*) Unilocular; (*b*) Multilocular; (*c*) Solid. Class (*A*) corresponds with dental cysts, (*B*) (*a*) with dentigerous. A better classification is that adopted by a committee of the British Dental Association,[2] whose report, published coincidently with the outbreak of the war, has not received the attention it deserves. This groups dental, dentigerous, and multilocular cysts under one heading, 'epithelial odontomes.' The Committee believe that all originate in the remains of the enamel organ, or of the tooth band, Malassez's 'débris épithéliaux paradentaires,' found in the periodontal tissue. Wohl agrees with Partch that dental cysts are purely of inflammatory origin, and dismisses as 'immaterial' whether or not the cyst has an epithelial lining as described by Turner.

The paper by Partch referred to has not been obtainable, but is possibly the same as that[3] read before the fifth International Dental Congress in the same year. Partch set out to prove: (1) The epithelium of these cysts arose from these remnants, and not from the epithelium of the oral mucous membrane growing into and along a pre-existing sinus, as stated by Grawitz; (2) That the origin of the cystic fluid was not from degeneration of the epithelium, but from

PLATE VIII.

CYSTS OF DENTAL ORIGIN

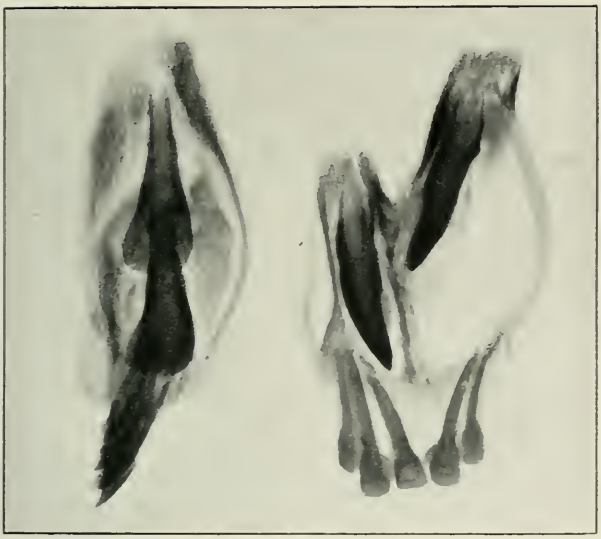


Fig. A.—Unerupted incisors in mandible of a sheep, with cyst on one side but not on the other.

Fig. B.—Unerupted canine, with cyst on one side of tooth.

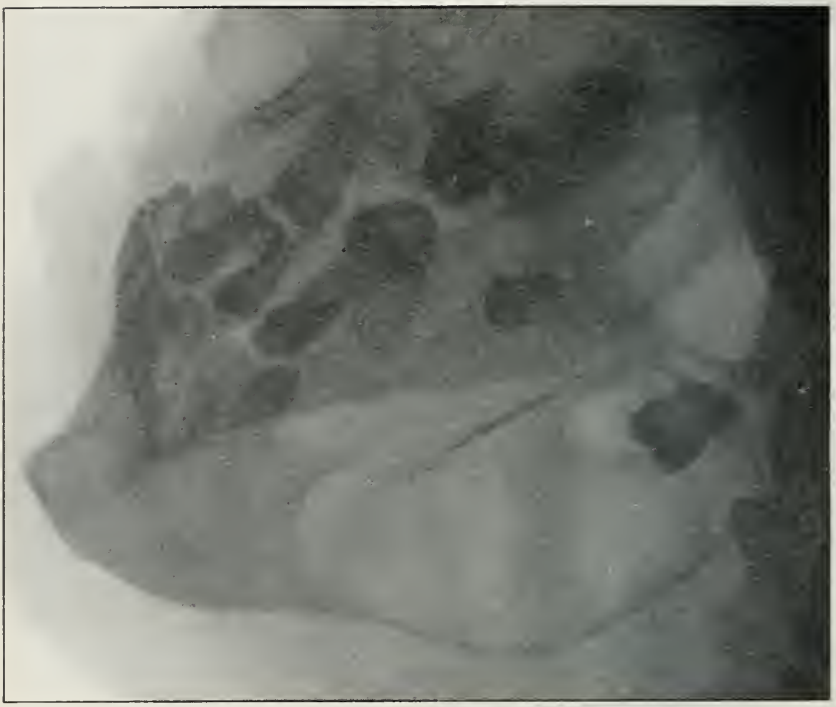


Fig. C.—Cyst of the mandible in connection with a wisdom tooth which could not be seen.

By kind permission of the Royal Dental Hospital.

Fig. D.—Partly-formed first upper premolar, with cyst attached.

From a photo lent by Mr. Montague Hopson.

PLATE X.

CYSTS OF DENTAL ORIGIN—*continued*

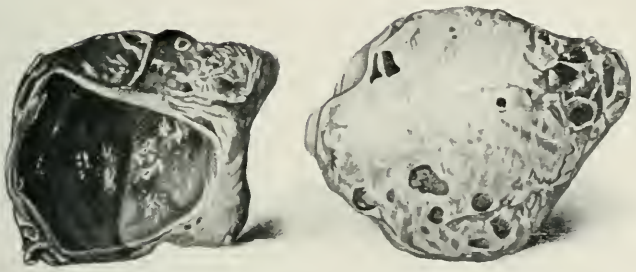


Fig. E.—Unilocular and multilocular cyst of jaw.

Drawn from 'Annals of Surgery.'

Fig. F.—*a*, Cyst in maxilla causing no swelling on facial surface.

mesodermal structures; and (3) That cysts exist in granulomata devoid of epithelium.

It is admitted that many granulomata found on the roots of septic teeth are merely masses of granulation tissue of inflammatory origin. But Partch, examining such, and others containing epithelium, claims to have found slit-like spaces in the connective tissue. These spaces he regards as the beginning of cysts around which the epithelium is subsequently moulded. The spaces are quite microscopical, but, if present *in vitam*, much is necessary before their connection with macroscopical cysts is proved. Most observers have verified the presence of an epithelial lining in tooth cysts, and it would appear more logical to assume that in the few exceptions when it is not found, only a single layer of flattened cells was present, and this was lost during the preparation of the section, or during the operation, or destroyed during preceding suppuration. Partch's method of treating these cysts is based on the presence of this epithelial lining. Moreover, although cysts certainly almost always arise in connection with septic teeth, the contents of an unopened cyst are not septic, and frequently the teeth are removed without opening the cyst; then the cyst, in the absence of all inflammatory phenomena, continues to grow.

At the Congress, Rumpel followed Partch with a paper[1] giving the histopathology of forty cysts, and described in detail the epithelial cells stained after Unna's method. The nucleus was sharply defined, with one to three nucleoli. The cells were of various shapes; some had long, whip-like, branching processes, the cells resembling ganglion cells. Some were spindle-shaped. In others, broad processes of neighbouring cells joined together, enclosing spaces. The character of these cells, and other facts, made Rumpel doubt their ectodermal origin. Be this as it may, they can hardly be regarded as 'immaterial,' nor can the facts be harmonized with Brophy's statement, "Such cysts have a periosteal lining."[5]

It is not clear why one tooth remains buried and causes no apparent change in the surrounding tissues, while another, sometimes in the same jaw (*Plate VIII, Fig. A*), causes a dentigerous cyst. Wohl agrees with Senn that probably "trauma or inflammation plays a rôle by increasing the blood supply, which stimulates the cells to active proliferation." The same sentence occurs in Brophy's book. But if this be so, wherein is the essential difference between these and dental cysts?

The Committee of the British Dental Association dissent from Sutton's term, 'follicular odontome,' because (1) It has been claimed that Nasmyth's membrane has been separated from teeth found in dentigerous cysts, and if, as shown by Paul, the external epithelium of the enamel organ enters into its formation, it cannot also form the epithelial lining of the cyst wall and this be part of the follicle; (2) The cyst is often to one side of the tooth, this being outside of it (*Plate VIII, Fig. B*); (3) In other cases, on opening the cyst, the

tooth can be seen to be separated from it by tissue varying in thickness from vascular tissue to a thin transparent membrane. Owing to the hidden position of some teeth in the cyst it is often impossible, on opening the latter, to see the relation of cyst lining and tooth (*Plate IX. Fig. C*), whilst as the only nourishment that can reach such a membrane is from the periphery, when it has been stretched over the crown of the tooth, by the latter's 'eruption,' or, possibly more correctly, by the growth of the cyst around it, it follows that this would be prone to degeneration, and the tooth must sometimes, as a secondary event, be actually in the cyst. Possibly, too, this epithelium is destroyed during attempts to extract the tooth.

Cysts are found growing from, and connected to, the periodontium of sound teeth which are erupting or have erupted (*Plate IX, Fig. D*). They seem to form a connecting link between dental and dentigerous cysts, between which no essential structural difference has been shown. Wohl illustrates a tumour (*Plate X, Fig. E*), one half of which consists of a single cyst, the other of many cysts. Partch states that dental cysts may have daughter cysts in their walls. The reason for Wohl's subdivision 'solid' is not very clear, since the cases illustrated were cystic, but less cystic than usual. One he instances, the size of a cherry, which was easily shelled out of the upper lip of a man of 25. He attempts to prove that this grew from an epithelial tooth remnant. The position in the lip not being stated, its connection with a 'dermoid' is not excluded.

That granulomata are not always innocent tumours is seen in the following case. Some years ago, on May 7, a man, age 49, attended the dental department of the London Hospital. He complained of pain in the left lower wisdom tooth and over that side of the face. It was of a pricking character, and the patient thought it varied with the weather. The tooth was tender to bite upon, slightly raised, and there was some bogginess around it. The submandibular glands were a little enlarged, and hard. The tooth was extracted; attached to its root was an elongated mass of what appeared to be granulation tissue. The pathological report showed it to be an epithelioma.

Owing to the frequency of dental cysts they are important clinically. They often become opened and suppurate, and are then mistaken for abscesses. Sometimes, the cause of the swelling not being recognized, the tooth is extracted, and the cyst is casually opened, but not otherwise treated; then it suppurates or becomes infected and foul, and the patient suffers from septic absorption. Simply to remove the tooth is useless. As large an opening as possible should be made, and the cyst wall dissected or curetted out. Packing, save to arrest the initial hæmorrhage, is not required, and is often harmful, since it prevents the cavity closing and retains any discharge. The cyst should be left open and syringed. Partch, regarding the epithelial lining as being of the same origin as that of the oral mucous membrane, does not remove the lining membrane of the cyst, but lets the epithelium grow over the edge of the opening made and join on to

that of the oral mucous membrane. This prevents the opening from closing, and the cyst gradually shrinks. Many follow Partch's technique in Germany with good results. Hence the healing of a cyst is not necessarily due to the formation of granulation tissue, but must be associated with some change in the bone of the walls. When a cyst forms in the maxilla there may be no external swelling (*Plate X, Fig. F*), the cyst growing into the antral cavity, the outer wall of which becomes displaced inwards and thinned so that it may be transparent. Thus the antral cavity must be reduced to a mere fissure. Nevertheless, in one such case the size of the antrum was found to be entirely re-established, some years later, when it was necessary to open it for an empyema.

References.—[1]*Ann. Surg.* 1917, ii, 672; [2]*Report on Odontomes* (British Dental Association); [3]*Verhandlungen des V. Internationalen Zahn. Kong.* vol. i, 264; [4]*Ibid.* 269; [5]*Oral Surgery.*

DEAFNESS. (*See* Ear.)

DEATH, A NEW OCULAR SIGN OF. *Herbert French, M.D., F.R.C.P.*

Terson[1] has added a new test to those already known, with a view to establishing the certainty of death on the battlefield. He recommends the placing on the conjunctiva of a minute quantity of **Dionin** (ethylmorphine) powder. If death has already occurred it is without effect, but if the patient is still living, although *in extremis*, an immediate and intense local reaction is produced, with a purplish-red coloration of the ocular conjunctiva and localized chemosis, which disappears rapidly without leaving a trace or causing inconvenience.

Reference.—[1]*Lancet*, 1917, ii, 358.

DEMENTIA PRÆCOX. *Bedford Pierce, M.D., F.R.C.P.*
Kate Haslam, M.D.

Etiology.—F. W. Langdon[1] reviews the three chief theories of the cause of dementia præcox:—

1. That it is due to some unknown toxin or toxins of a character specific to this disease, acting directly on the nervous mechanism through the nutrient fluids or indirectly by disturbances of the organs of internal secretion. Southard concluded that dementia præcox must be removed from the class of functional psychoses and placed with the structural diseases.

2. That in dementia præcox we are dealing with an organism inherently defective in make-up, or of incomplete evolution, unable to effect adjustment to the increasingly complex conditions of existence incident to puberty and adolescence.

3. That the defective adjustments are chiefly or entirely due to psychogenic causes.

Langdon considers (2) and (3) not only compatible, but essential to each other, and believes that the hand-shake and structural peculiarities of the hand (as described by Stoddart) of great importance as diagnostic and prognostic indicators. He says any practical

plan of therapy for dementia præcox should recognize the biological tripod of sub-evolution, neuro-toxæmia, and faulty psychogenesis as the probable basis of the disease, the obvious indications for treatment being: (*a*) Removal of the patient from sources of psychic conflicts and difficult adjustments at as early a stage as possible: (*b*) Rest in bed to promote resistance to the toxic element; (*c*) Treatment of anæmia and other morbid blood states: (*d*) Hydrotherapy to aid elimination; (*e*) Nutritional and constructive agencies to be pushed to the limit: (*f*) In early stages, while still possible, psycho-analysis and psycho-therapeutic treatment.

Sajours[2] urges the importance of the thymus gland in dementia præcox, and states that from comparison of various data with regard to glands and mental states we are brought to realize that thymic deficiency entails more or less deficiency of the other ductless glands, and that we find in these organs a possible clue to an underlying cause of dementia præcox. We must bear in mind the influence of toxins on mental diseases, and must not overlook another feature, viz., that lesions are sometimes produced in the brain itself in the course of acute febrile infections. Early recognition of disease of the ductless glands becomes therefore of the utmost importance, and Sajours gives as the chief signs of:—

1. *Thymus deficiency*: (*a*) Deficient development of the osseous system and of the epiphyses; (*b*) Deficient mental development; (*c*) A low relative lymphocyte count.

2. *Thyroid deficiency*: (*a*) Subnormal temperature; (*b*) A doughy dry skin, with at times axillary or cervical fat-pads due to plastic infiltration and circulatory torpor: in marked cases, scaly skin and dry, brittle hair and nails, due to deficient nutrition of these structures; (*c*) Mental torpor or deficiency where true thyroid stigmata are discernible, complete development of the brain requiring perfect co-ordination of the thyroid, adrenal, and thymic functions.

Douglas Singer[3] suggests that dementia præcox may be a development along faulty lines, and not an arrest of development.

Smith Ely Jelliffe,[4] in a paper on the vegetative nervous system and dementia præcox, explains that "by this system is meant that collection of nervous receptors, connectors, and effectors which, acting upon the unstriped muscles of the body and upon the secretory glands, external as well as internal, constitute the chief mechanism by which the metabolism of the body is regulated. The endocrinous glands are part and parcel of the vegetative nervous system." He points out that there is abundant evidence that in the schizophrenic group is found a most fertile field for the observation of vegetative nerve disorders. He considers that the chief characteristic of the schizophrenic is a persistent unconscious emotional stress; this causes his generalized visceralosis, and induces the vegetative nervous disorders. What the emotional factors really are can be learned from psychopathology, and here, he concludes, lie the chief answers to the problem of dementia præcox, as he considers the vegetative

nerve disorders are the results of maladaptation rather than its causes.

A. Myerson[5] finds that a paranoid condition in ancestors breeds dementia præcox in descendants; also that dementia præcox in an ancestor is usually followed by dementia præcox in the direct insane descendant; moral imbecility, feeblemindedness, and epilepsy are also found in the descendants. Manic-depressive insanity seems to be exceptional in the descendants.

L. Vernon Briggs[6] says that senile dementia-involution psychosis and manic-depressive psychoses in an ancestor are quite likely to be followed by dementia præcox or imbecility. On the other hand, it is rare to find an ancestor with a dementia-præcox type of psychosis who has a descendant with manic-depressive insanity.

Diagnosis.—In a paper on the Abderhalden reaction in mental diseases, H. Cotton, Corson White, and W. W. Stevenson[7] present the results of the test in 289 cases, including the various psychoses and some normal people. The original method was used in all cases, and pituitary, thymus, thyroid, pancreas, adrenal, ovary, and testicle, but *not* brain tissue, were used. The blood was always taken before breakfast, and the tests made within three hours. They found: (1) That the Abderhalden reaction gives certain definite and uniform results. (2) That these results were practically negative except in dementia præcox and epilepsy. (3) That in dementia præcox 81 per cent showed a positive reaction to sex gland, and in 3 cases out of 55 gave a positive reaction to thyroid and sex glands (two of these cases were of the catatonic type). Differential blood-count showed rather characteristic conditions in dementia præcox —i.e., red blood cells high, white cells low, lymphocytes high, and polymorphonuclears low. (4) That our knowledge at present of the incidence of tuberculosis in dementia præcox justifies the hypothesis that probably the former stands in some etiological relation to the latter. (5) That in epilepsy practically all the cases (69) gave a positive reaction to adrenal gland. They conclude that the value of these reactions is to lay the foundations for therapy based upon the facts deduced.

Pathology.—E. E. Southard and M. M. Canavan contribute an analysis, chiefly stratigraphical, of certain lesions, notably nerve-cell loss and gliosis (including satellitosis) in four cases of dementia præcox. These were cases which showed no gross aphasia, sclerosis, or atrophy in the gross brain, and yet had exhibited symptoms of two years' or greater duration entitling them to be considered in the dementia-præcox group. In connection with this work, a review of Kraepelin's estimate of structural work in dementia-præcox brains is offered, and the stratigraphical data are presented in relation to Kraepelin's views as to the functions of suprastellate and infrastellate layers. Absence of suprastellate lesions in a case of the paranoic or paraphrenic group was noted, but there was no special evidence of schizophrenia in this case as clinically viewed. The case showed infrastellate lesions in

areas contiguous with one another in the two flanks of the brain. It might be possible to correlate the late catatonia and late hallucinosis in the case with these infrastellate lesions. Other cases possibly more typical of dementia præcox had lesions both in the suprastellate and the infrastellate regions, sometimes numerous, sometimes isolated and apparently capricious in distribution. No good example of lesions chiefly limited to the suprastellate layers has been found. Gliosis and satellitosis do not follow the nerve-cell losses. The same holds true of shrinkage changes and axonal reactions. Nor is satellitosis closely associated either with shrinkage changes (which are not numerous in this series) or with axonal reactions. The dissociation of parenchymatous (neuronic) and interstitial (neuroglia) changes reported in a previous communication is further emphasized.

TREATMENT.—Noboru Ishida[8] reports the result of treating ten cases of dementia præcox, not seriously ill physically, by a 0·9 per cent solution of common **Salt** given intravenously. In 50 per cent of the cases an interest in work followed directly. Remissions were observed in several cases, four months being the longest. In one case with violence he considers the infusion was efficacious in subduing this state, and more desirable than confinement or other methods of restraint. Kraepelin has stated that sodium chloride infusions sometimes influence patients to take food, especially when its refusal is based on confusion and restlessness.

REFERENCES.—[1]*Amer. Jour. Insan.* 1917, April; [2]*N. Y. Med. Jour.* 1917, i, 961; [3]*Jour. Abnorm. Psychol.* 1917, Jan.; [4]*N. Y. Med. Jour.* 1917, i, 968; [5]*Jour. Nerv. and Ment. Dis.* 1917, Feb.; [6]*Amer. Jour. Insan.* 1917, Jan., 472; [7]*Ibid.* 234; [8]*Ibid.* 1917, Jan.

DEMODEX FOLLICULORUM ERUPTION.

E. Graham Little, M.D., F.R.C.P.

Lawrence[1] describes an impetiginous eruption of the face occurring in association with large numbers of *Demodex folliculorum*, parasites which have usually been regarded as harmless denizens of the skin. The lesions are less pustular than in impetigo, but are less tractable, and show a tendency to form rings with a raised border. Scrapings from the skin reveal the parasite in greatly increased numbers, as compared with what may be regarded as normal. The pathogenicity of the same parasite in dogs makes it probable that it may also be the cause of disease in man. The treatment recommended consists in painting the lesions with **Tinct. Iodi** after rubbing the parts with a **Salicylic Acid** and **Boric Ether Lotion.**

REFERENCE.—[1]*Edin. Med. Jour.* 1917, Aug., 132 (abstr.).

DENGUE.

Sir Leonard Rogers, M.D., F.R.C.P.

J. B. Cleland, B. Bradley, and W. McDonald[1] have proved that *Stegomyia fasciata*, when fed on the blood of dengue patients and taken to Sydney, where the disease was not endemic, produced typical attacks of the fever in four patients, although in some others negative results were obtained. At the same time *Culex fatigans* were separately

used for a similar experiment, with entirely negative results. This demonstration that the mosquito which carries yellow fever can also convey dengue is of great interest and importance.

W. L. Harnett[2] discusses the relationship between dengue and sandfly fever, and shows by careful blood-counts that the leucopenia with relative decrease of the polynuclears and increase of the large mononuclears, and also the late increase during convalescence of the eosinophiles which he had previously pointed out in dengue, are all common to both diseases. Various observers have found the long and the short type of fever occurring at the same time in outbreaks in various parts of India, and he suggests that they are the same disease, with varying incidence of the two types.

R. G. Archibald[3] writes on seven-day fever in Anglo-Egyptian Sudan, in which he found all the well-known characters of dengue in the symptoms and blood changes. He thinks the *Stegomyia fasciata* is the carrier. He agrees with others in considering **Ac. Acetylsalicyl, Alkalies,** and **Salicylates** to be the most useful drugs.

W. H. King[4] deals with the Porto Rico epidemic of dengue of 1915, and the clinical types of the disease. The disease appears to be endemic in the island, and to become epidemic at times, when the place may narrowly escape being put in quarantine on the suspicion of yellow fever. The present outbreak began in September, and rapidly attacked a considerable percentage of the inhabitants of San Juan town. Rural dwellers generally escaped unless they visited the city. No death was attributed to the disease, while elderly people usually escaped. Clinically, he agrees with most authorities in considering Rogers's seven-day fever as a type or variety of dengue. All the four types described by Megaw were met with.

References.—[1]*Med. Jour. of Australia*, 1916, Sept. 2; [2]*Ind. Med. Gaz.* 1916, Dec.; [3]*Jour. Trop. Med. and Hyg.* 1917, June 15, 133; [4]*New Orleans Med. and Surg. Jour.* 1917, Feb., 564, 572.

DENTAL CYSTS. (*See* Cysts of Dental Origin.)

DENTITION, DISORDERS OF. *Frederick Langmead, M.D., F.R.C.P.*

It is no longer believed that serious illness and death are caused by dentition, but the physiological process does not always run a smooth course, as is well exemplified by a case recorded by John Thomson.[1] It was that of a breast-fed but slightly rickety baby who, between the ages of nine and a half and twenty months, suffered from severe nervous symptoms which seemed always to be associated with the cutting of teeth. The first attack began when the lower central incisors were appearing, and continued with only slight intermissions for eleven weeks, by which time ten teeth had erupted. The attacks then ceased quite suddenly. The main features were photophobia and loud screaming; the child also vomited once. The photophobia was pronounced, like that seen in cases of corneal ulcer, the child hanging down his head and only opening his eyes very slightly in the dark. The eyes were found to be normal in every

respect. A 5 per cent solution of cocaine, instilled into the eyes, was the only remedy which had any effect, and this only relieved temporarily. One morning the child opened his eyes and looked about him, and there was no return of the photophobia for three months. The screaming was violent, and could be heard 200 yards from the house. It persisted almost all the time that the baby was awake, and was worse at night. Antipyrin (3 gr. every six hours) gave a little relief for a short time. Chloral had no effect. Eventually 10 to 20 drops of **Laudanum** were given for six weeks, and after that as much as 18½ drops for four weeks, every night at bedtime. This effectually quieted him, but did not make him sleep much. The screaming ceased as suddenly and at the same time as the photophobia, and no difficulty was encountered in stopping the laudanum.

After three months' interval the symptoms suddenly returned, and the four canine teeth were found to be bulging the gums. Five weeks later these had all erupted, and the symptoms again suddenly ceased. A third attack occurred when the child was twenty months old, when the lower back molars were found to be erupting. The symptoms persisted for some weeks, and then ceased abruptly, never to appear again.

On no occasion was there any redness, swelling, or tenderness over the coming teeth, and the gums were not lanced. The boy grew up to be an ordinarily healthy lad of normal intelligence.

REFERENCE.—[1]*Edin. Med. Jour.* 1917, Mar., 203.

DERMATITIS. (*See also* ACRODERMATITIS and ACRODERMATOSIS.)

E. Graham Little, M.D., F.R.C.P.

Simpson,[1] after investigating the mechanism of the dermatitis so commonly produced by handling *Primula obconica*, claims to have demonstrated the presence of two active poisons, one a glucoside, and the other an acid constituent of the resin. Neither of the poisons is an oil, as has been assumed to be the factor in the production of primrose dermatitis. He also shows that the classification of this phenomenon with anaphylaxis is a misnomer, as the latter method of reaction presupposes the previous presence in the body of some sensitizing substance or antigen, which must necessarily be a protein. An important differentiation between drug hypersensitiveness and anaphylaxis as usually understood is, that in the former case the continued administration of the drug increases the reaction, while in true anaphylaxis the reaction, if not leading to sudden death, decreases and finally ceases with continued administration of the antigen. The dermatitis produced by the plant is to be regarded as due to cellular or epithelial irritability, not to toxins. The poison is found in the glandular hair of the leaves, and can be extracted from these by absolute alcohol.

Several observers[2] have recorded the effects on the skin of contact with powder evacuated from German *bombs* in the recent air raids in London and elsewhere. A notable circumstance, pointed out by

Adamson, is the occurrence with some constancy of an incubation period, averaging nine days, between contact and first symptoms. These were fairly constant also, and comprised intense itching, severe pain, and nausea (Tyson), coupled with the appearance of clear vesicles closely resembling those of dysidrosis or cheiropompholyx. The eruption would usually reach its acme in four to five days, and subside in a week, with exfoliation of the epidermis. The hands and feet were much the most commonly affected sites, but the face, and in one instance the scrotum, were involved. Treatment as recommended by Adamson includes soaking of the hands and feet in hot water for half an hour several times a day, and mopping on of **Calamine Lotion** after the soaking. For immediate treatment of parts subjected to the dangerous contact, Sequeira recommends a weak alkaline lotion, e.g., **Sodium Bicarbonate,** one teaspoonful to a quart of water. Adamson comments on the absence of suppuration, but Sequeira met with this occasionally, and recommends spraying the parts in bad cases with **Malachite Solution,** e.g., malachite green 1, hyd. perchlor. 5, spt. vini rect. 100 parts. The causative agent is stated by Sequeira to be hexa-nitro-diphenylamine, a substance very nearly of the same composition as the dye known as aurantia, which produces a very similar dermatitis, met with not infrequently in trades in which the dye is used, as in the manufacture of brown-leather boots.

Dermatitis Artefacta.—Collie[3] has a useful paper on the methods adopted by unscrupulous or hysterical persons to produce eruptions of the skin, and describes some means of detecting them. A careful consideration of the nature and distribution of the lesions will usually betray their character. The lesions are superficial, they appear at irregular intervals, and the condition produced is unlike any recognized disease. Their shape is often suspicious, for as the injuries are generally caused by the patient's hands, the direction will follow that of the activities of the hand, usually the right hand. Perfectly circular and strictly linear eruptions common in artefact conditions are never met with in true disease. Occasionally, as when the injury is produced by acids or caustics, the trickle lines of the liquid irritant may be discernible, and in cases of recent application of the irritant the nature of the agent may be demonstrated by its action on litmus paper, or by a characteristic smell, as for instance of vinegar (a common means) or carbolic acid. The distribution is usually restricted, the skin surrounding the lesions is healthy, and the production is sometimes obviously a response to suggestion, as when an expectation is expressed in the patient's hearing that a lesion may appear in a certain part, and this expectation is shortly realized. Many patients are distinctly hysterical subjects, and they may show stigmata of hysteria, such as the anæsthetic palate, hemi-anæsthesia, etc. Sometimes a monetary motive may be apparent, as when the patient obtains in compensation for unemployment more money than the ordinary wages would amount to. As the patient is usually

careful not to cause herself real pain or discomfort, sensitive areas, or those in which disfigurement is obvious, are usually avoided. Thus the face, scalp, knees, hands, and soles of the feet are generally exempt.

The methods adopted are extremely various. The finger wet with saliva or urine, and rubbed on the skin, is a frequent device, sometimes reinforced by pricking with a needle, rubbing with a match-end, or, as in an interesting case recorded, with a piece of pumice-stone concealed in a handkerchief. Purpura may be simulated by striking the skin with a hard brush. Hot-water bottles may be used to produce scalds. Carbolic acid, cantharides, mustard-leaf applications, and croton oil are fairly common agencies. Pre-existing skin disease may be wilfully aggravated and kept up for pecuniary reasons; such cases are difficult to detect, and it is often impossible to decide whether the patient's occupation, when this involves exposure to irritating contacts, or the desire to profit by disability, is the true explanation of the chronicity of an eruption. *Trade dermatitis* covers a very extensive field, and the disability may be genuine. Close and skilled medical observation of the behaviour of the eruption when the patient is protected from the contact will often allow of a discrimination of true from feigned eruptions.

Lastly, it should be remembered that many plants, such as the primula and nettle, may produce eruptions which closely simulate erysipelas; the eruption usually starts on the fingers and back of the hands, the wrist, and forearm. It generally lasts for a few days to three or four weeks. (*See also* MALINGERING.)

Occupational Dermatoses.—Prosser White contributes an interesting *résumé* of some irritative dermatoses with which conditions of war have rendered us familiar in this country of late. Of these the most important from its frequency is *trinitrotoluene dermatitis*, caused by the fine dust produced by sieving the explosive powder, the irritative constituent of which he demonstrated by a personal experiment to be trinitrotoluene. The earliest rash is a superficial erythema, but, as usually seen, consists of patchy, irregular-shaped, slightly raised areas of redness varying in size from a pin-head to a shilling, between which is the normal-coloured skin. These spots coalesce by spreading at the edges and by the formation of new centres. The parts most affected are the hands and arms, the neck, the lower part of the abdomen, the inside of the thighs and scrotum, the back above the buttocks, the calves, and between the toes. On exposed and constantly irritated surfaces such as the arms, a continuous sheet of redness ultimately develops. The skin becomes greatly thickened and takes on what Sabouraud calls 'secondary lichenification.' Moisture appears to dispose towards the production of vesicles, which quickly rupture by chafing, especially on the thin epidermis of the scrotum and thighs. Here the inoculation of pyogenic organisms readily produces superficial ulcers. The character of the desquamation follows the ordinary rules and depends upon the severity of the inflammation and the thickness of the epidermis. Crusting is slight.

Hot weather causing much sweating increases the prevalence and severity of the trouble. The exposed skin nearest the work is in every case the earliest seat of the lesions. The rolled-up sleeve will often limit the extent of the lesions on the hands and arms. A rash round the neck and on the triangular space on the skin over the throat and chest will sharply define where the collar of the overall has failed to cover, and has been left open at the front. The scrotum, penis, and inner aspects of the thighs are commonly affected in prolonged cases, sometimes showing a continuous sheet of redness. The powder is introduced to these parts by the fingers when inserted there for necessary purposes, and the condition is aggravated by chafing, heat, and moisture. The powder will fall between the tops of clogs or through the fronts of boots improperly laced, causing a dermatitis on the tops of the feet. In these circumstances, if the socks are infrequently changed, much persistent irritation and trouble is found between the toes. In no case have the heads of the workers been affected, probably because caps covering the hair are usually worn.

The best means of prevention of the dermatitis is found to be covering the skin before exposure—the hands and feet as well as the arms. Openwork stockings have been the undoing of many female workers, and clogs worn instead of boots have been shown to be insufficient protection to the foot. Overalls, gaiters, and gloves should be frequently cleaned.

Nitrate of ammonia, which is also one of the ingredients of the explosive powder, may rather exceptionally produce a dermatitis. *Stomonal*, a composite explosive containing more than half its bulk of nitrate of ammonia, together with common salt and nitroglycerin, may cause a severe dermatitis, developing into an eczematous weeping condition, accompanied by intense itching.

The author commences treatment with the application of the following paint, which must be dabbed freely upon the inflamed and itching surfaces, preferably by the practitioner himself. It must not be used to mucous surfaces.

R	Camphor.	℥ij	Acid. Picric.	℥ss	
	Acid. Carbol.	℥j	Spt. Vini Rect.	℥vj	℥vj
	Hydrarg. Perchlor.	gr. xv			

M. Ft. pingt. Apply by a swab or brush.

For the patient's use this paint is too strong, and the following dilution is preferred: Paint as above, 2 oz.; lotio calam. co., 4 oz.; pulv. acaciæ, ½ dr.

Ointments are inadvisable during the daytime, when the men are exposed to the dust of their trades; but worn at night or under bandages the following is very soothing:—

R	Zinci Oxid.	1 part	Acid. Oleic.	9 parts	
	Stand for two hours.				
	Emplast. Plumbi	10 parts	Parenol Liquid	13 parts	
	Parenol Solid	25 parts	Hydrarg. Ammon.	2 parts	

Ft. ung.

In the preparation of *cotton thread*, mechanical injury is in some cases caused by the necessity of breaking the thread continually with the fingers, the skin of which becomes sore and cracked. Another cause of dermatitis in the same industry is the use of a chemical antiseptic, the active ingredient of which is often formaldehyde, to prevent mildew. Other agents used for the same purpose are alum, zinc and magnesium sulphate, sodium fluorsilicate, etc., all of which may be irritant to the skin. The mere maceration in water is also a cause of injury to many skins.

References.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 95; [2]Sequeira, *Brit. Med. Jour.* 1917, June 30 and Aug. 4; Adamson, *Ibid.* July 14; Troon, *Ibid.*; [3]*Lancet*, 1916, ii, 1008.

DIABETES. *John D. Comrie, M.D.*

The amount of work that has been done upon the subject of diabetes during the past year is not very great, and most of the articles that have appeared have been in corroboration of the method of treatment by alimentary rest mentioned in the Medical Annual for 1916, p. 203, and for 1917, p. 162.

Diagnosis.—Addis[1] contributes an article upon the early diagnosis of diabetes, based upon the examination of the urine in 2165 cases of out-patients of all sorts coming to his clinic. Among these he found that a positive Benedict test was present in 192, while in 33 of these the reducing substance was shown to be sugar by the formation of osazone crystals and by the fermentation test. Thus he found, roughly, 1 patient with glycosuria but no other evidence of diabetes among every 100 coming to the clinic, and he therefore set about devising a test which should differentiate cases of non-diabetic from true diabetic glycosuria. As the essential difference lies in the fact that a diabetic patient is unable to use surplus sugar in the organism, he based his test upon the result of administering increasing quantities of glucose on four successive days, and noting the result upon the urine. The test is carried out as follows: On the first day 20 oz. of water are taken by the patient in the morning, fasting, and exactly two and four hours later he passes the urine into two separate bottles; on the second day a similar procedure is carried out, but in addition 25 grms. of glucose are taken with the water; on the third day 50 grms. are thus taken, and on the fourth 100 grms. The urine of cases diagnosed as non-diabetic glycosuria either showed no increase at all in glucose after even 100 grms. had been administered, or at most showed only a trifling rise to 2·5 grms. or thereabout; while the urine of cases diagnosed as diabetic showed, when the larger amounts of glucose were taken, a great increase, amounting to as much as 25 or even 49·7 grms. The writer found that the reliability of the test was proved by the subsequent progress of the cases.

It is pointed out by Collie[2] that the connection of injury and of malingering with glycosuria is important at the present time. He states that transient glycosuria may be found in many nervous

diseases, and may even occur as the result of nervous states—such as shock, fright, and anxiety—but that nothing in the nature of a permanent glycosuria from accident can be induced except by head injury or other result of serious traumatism. He gives a reminder that the sugar usually added by the malingerer is cane sugar, which does not reduce Fehling's solution.

In view of the fact that a toxæmia of alimentary origin has long been considered one of the probable factors in the causation of diabetes, Case[3] made a röntgenological study of the gastro-intestinal tract in 72 cases. He found that gall-bladder derangements are very common in diabetes, especially lesions of the gall-bladder associated with pericholecystic adhesions, but that the stomach empties itself with unusual rapidity in the average case of the disease. Contrary to the generally accepted theory, he found that duodenal stasis was rare, the functions of the duodenum having been normally carried out in all save one of the cases that he examined, and no increase in size or other abnormality of the duodenum being noted. There was, however, in a large proportion of cases, abnormal slowness in the passage of the barium meal through the ileum; six cases showed slight, and ten cases marked, ileal stasis.

The influence which the War has had upon diabetes, from the German point of view, is touched upon by von Noorden.[4] He gives his experiences in 54 cases which he has treated since the War began. Of these, 4 officers had been considered quite fit for garrison duty before the War, but broke down under the strain of active service in a few months. Diabetics did not seem to suffer any exacerbation from wounds, though intercurrent infectious diseases were followed by a marked rise in urinary glucose. There was no special liability of the diabetics to contract nephritis: in fact, as none of these diabetics were affected by this frequent war disease, it is to be assumed that glycosuria to some extent protects the kidneys. In 37 of his 54 cases the diabetes developed for the first time on active service, but he does not think that nervous stress alone is able to elicit diabetes. He adds that while fat is the mainstay of diabetics, and while it is at present the most difficult kind of food to procure in Germany, a very satisfactory arrangement was made to supply certified diabetics with a **War Diet** of eggs (10 weekly), butter 500 grms. (later reduced to 300 grms.), fresh meat 250 grms., and cream 300 grms.

The importance of the recognition of the fact that cases of persistent glycosuria occur in which there is no tendency to downward progress, and in which the amount of sugar excreted bears no relation to the amount taken in the food, is emphasized by Graham.[5] Glycosuria associated with renal disease, in which the kidney alone is at fault, has been recognized by other authors, but for this type not associated with renal disease Graham proposes the name of 'diabetes innocens.' He finds that there are two types of case in the five persons whom he has studied: one where the output of sugar is very small, and is not appreciably altered by a dose of sugar (tested in

the same way as described by Addis above); and a second, where the output of sugar is greater, and is increased to some extent by feeding on sugar. He concludes from the relation between the amount of sugar excreted and the amount of sugar in the blood that this is actively excreted by the kidneys, and that the prognosis is very good.

The clinical significance of the glucose-nitrogen ratio in diabetes mellitus has been studied by Janney,[6] who concludes that for the proper study of this function the patient should fast entirely for several days: the amount of glucose and nitrogen excreted being respectively estimated, a valuable indication for prognosis is given. When the relation of glucose to nitrogen is as 0 : 1 the prognosis is highly favourable, and it gets worse the nearer it approaches to 3·4 : 1, a ratio which has the gravest immediate significance.

Treatment.—The rôle of **Fat** in diabetes has been somewhat exhaustively studied by Allen,[7] who was one of the originators of the starvation treatment in this disease. He finds that the protein-sparing power of fat persists in diabetes, and that the increase in fat combustion is a sufficient explanation of the ketonuria which follows any single fat meal or prolonged feeding with this substance. He holds also that severe cases which are kept alive for months or years on low protein and carbohydrate, with glycosuria and acidosis kept up essentially by fat, are the cases that offer the greatest difficulty for successful treatment or for building up a tolerance for any kind of food. Any attempt at high nutrition, even with fat, is therefore bad, and patients should not be maintained on a luxus level of diet or weight. Restriction of single foods as carbohydrate or protein suppresses symptoms temporarily, but the proper line is to lighten the total load upon the weakened assimilative functions, and not overfeed even with fats.

Cammidge[8] explains the value of the treatment by alimentary rest on the grounds that many cases are associated with chronic catarrh in the upper alimentary tract (71 per cent of his own cases). In addition to occasional periods of **Starvation,** he recommends careful **Alkaline Therapy**—for example, by large oral doses of sodium bicarbonate. He points out, too, that a **Vegetable Diet,** being rich in bases, tends to check the sugar content of the blood, and thus to raise tolerance for carbohydrates.

Greeley[9] lays great importance upon **Exercise,** as well as upon restricted eating, for diabetics, and points to the well-known fact that diabetics are better in summer than in winter as corroboration, since there is lack of exercise in the winter months. He thinks that vigorous exercise after meals is particularly beneficial.

Some recipes are given by Nicholson[10] for home-made **Bread Substitutes,** which have the effect of giving a palatable and yet almost starch-free bread, useful in some cases. The following is one formula: Peanut flour 8 oz., casein 2 oz., a pinch of salt, white of egg 12 oz.: the white of egg is beaten to a snow, and then the other ingredients

(previously lightly mixed) are slowly added, and the bread is baked in an oven in a tin.

The treatment of diabetes by various **Light Diets**, which have the effect of diminishing the strain on the alimentary organs just as fasting does, is described by Williamson.[11] The following is a very light diet which, when used for a week, he finds highly successful in abolishing the glycosuria :—

8 a.m.—Tea or coffee with one tablespoonful of cream. One egg (poached, buttered, or boiled).
10 a.m.—One glass of warm milk (10 oz.).
12 noon.—Custard, unsweetened (containing one egg and half a pint of milk).
2 p.m.—One glass of warm milk (10 oz.) or cream (1 oz.) in warm beef-tea (10 oz.).
4 p.m.—Tea with one tablespoonful of cream : one egg (poached, buttered, or boiled).
6 p.m.—Cream (1 oz.) in 10 oz. of warm beef-tea.
8 p.m.—One glass of warm milk (10 oz.).
10 p.m.—Cream (1 oz.) in warm beef-tea (10 oz.).

The method of **Alimentary Rest** is prescribed by Leyton[12] in the following manner : For two days preceding the fasting period the patient takes : Breakfast of weak tea with a little milk, two eggs, and a small piece of bread : lunch of 100 grms. lean meat, 200 grms. cooked cabbage, 60 grms. boiled potatoes, and a small baked custard pudding ; dinner of a plateful of clear soup, 120 grms. fish, 120 grms. cooked green vegetable, an egg, and an orange. Then during the 'rest' period he has : Breakfast, 200 c.c. of weak coffee without milk or sugar, and 100 c.c. of clear broth made from an eggspoonful of meat extract ; lunch, the same as breakfast : tea, 200 c.c. of weak tea ; dinner, 200 c.c. of weak tea and 100 c.c. of clear broth ; alcohol, only if the patient is accustomed to it. Thereafter, as soon as the urine is found sugar-free, 250 grms. of French beans or other starch-containing vegetable are added to this diet, and each day thereafter the food becomes a little richer, till at the end of fifteen days the patient has returned to a light but fairly normal diet. Hume[13] and Fremont Smith[14] give other methods by which the same principle of alimentary rest may be carried out. Martin and Mason[15] point out that while starvation in the ordinary individual usually results in acidosis, the opposite occurs in diabetes. Sometimes in diabetics acidosis is initiated by the starvation ; at other times a pre-existing acidosis is increased. Evidently there is a variation due to many circumstances, though starvation ultimately does make the urine acid-free.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 109 ; [2]*Med. Press and Circ.* 1916, Nov., 425 ; [3]*Jour. Amer. Med. Assoc.* 1916, ii. 858 ; [4]*Ibid.* 1536 (abstr. from *Med. Klin.* 1916, Sept., 991); [5]*Quart. Jour. Med.* 1917, April, 245 ; [6]*Amer. Jour. Med. Sci.* 1917, i, 44; [7]*Ibid.* 313; [8]*Brit. Med. Jour.* 1917, i, 503 ; [9]*Jour. Amer. Med. Assoc.* 1917, i. 1685 ; [10]*Brit. Med. Jour.* 1917, i, 82 ; [11]*Ibid.* 154 ; [12]*Ibid.* 252 ; [13]*Pract.* 1916, Nov., 430 ; [14]*Boston Med. and Surg. Jour.* 1916, ii, 476 : [15]*Amer. Jour. Med. Sci.* 1917, i, 50.

DIARRHŒA, FLAGELLATE. *Sir Leonard Rogers, M.D., F.R.C.P.*

In the course of studies of dysenteries during the past year much work has been recorded on the various flagellate organisms met with chiefly in diarrhœal stools. There is considerable difference of opinion regarding the pathogenicity of these organisms. A. F. Chace and A. N. Tasker[1] report on cases studied in New York, and consider that *Lamblia intestinalis* may cause diarrhœa, the nature of which can only be recognized by microscopical examinations of the stools. They advise 2-gr. doses of pure medicinal **Methylene-blue** every three hours by the mouth, together with 500 c.c. of a 1–500 to 1–200 solution of the same by enema once or twice a day. C. Dobell and G. C. Low[2] record a case of lamblia infection which they studied closely for long periods, with 62 negative and only 38 positive findings, showing the organism may be absent for from seven to ten days and yet recur. Taking this into account they tried all the usual forms of treatment recommended, without curing the affection. G. C. Chatterjee[3] records and illustrates a study of intestinal flagellates in 70 cases of diarrhœa and dysentery, and found pentatrichomonas 32 times, lamblia 15, macrostoma 18 times, and he considers each of these to be pathogenic. He also describes successful cultivation experiments. W. Roche[4] in Salonika found *Tetramitis mesnili* the most common flagellate, and lamblia next most frequently. He did not find any form of treatment had any result. Wenyon and O'Connor[5] also describe at length their findings on this subject, which are in close agreement with those of other observers. J. W. W. Stephens[6] and his co-workers have studied the prevalence of *L. intestinalis*, and conclude that three examinations of stools will only reveal 18 to 19 per cent of infections, and six examinations from 23 to 30 per cent.

References.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 1528; [2]*Lancet*, 1916, ii, 1053; [3]*Ind. Jour. Med. Research*, 1917, Jan., 393; [4]*Lancet*, 1917, i, 297; [5]*Jour. R.A.M.C.* vol. 28, 346; [6]*Ann. Trop. Med. and Par.* 1917, June, 27.

DIARRHŒA, INFANTILE. *Frederick Langmead, M.D., F.R.C.P.*

Joseph I. Grover[1] has studied this condition from the clinical side at Boston, U.S.A., from the material afforded by all the out-patients at the Children's Hospital during 1915. Every record was examined personally every day at the close of the clinic, and at the end of the year all the records of the diarrhœa cases were aggregated and used for the purposes of the investigation. Not only were the infectious diarrhœas and cases of diarrhœa with vomiting included, but every case with frequent loose stools. Five or more stools a day were always considered to be diarrhœa, as were also continued loose motions although less frequent. Many of them were relieved by home treatment; many were secondary to other disturbances or to medication; several were of very short duration. All these forms were included. Over 14,000 visits by patients were made to the medical out-patient department during the year, of which about 3500 were new cases: 588 patients, new and old, had diarrhœa: occasionally there was a

recurrence. The questions of home cleanliness, nursing, prevalence of flies, and quality of milk supply, were not gone into.

From the statistics he draws very useful conclusions. Children below the normal physical standard, and those born congenitally weak, are very susceptible. Babies between the ages of two and four months, especially those who have been recently weaned, seem to be marked for this disease. Weaning in the spring is closely related to diarrhœa in the summer. It is regrettable that so many babies have to be weaned before they are three months old, as this seems to be directly responsible for much of the trouble. Nursing for over twelve months also appears from the statistics to do more harm than good. The seasonal occurrence from July to September depends more on the absolute humidity than on any other single factor. The infectious diarrhœas occurred especially in the summer months, as did the diarrhœas of those who had been nursed over a year and of those who had been fed on the proprietary foods. These and malt soups were the cause of many of the cases. Carbohydrate fermentation, excoriated buttocks, and the diarrhœas were always closely associated. Children with other diseases and ailments are the most liable to be affected. As etiological factors next in importance to absolute humidity, carbohydrate fermentation and a susceptible physical condition stood out most prominently.

Treatment.—The most favourable form of treatment for the infants on bottle-feeding proved to be a **Catharsis,** and a weak food as a temporary measure, followed by a formula with low sugar content; that for the older children, barley jelly, boiled skimmed milk, toast, and toasted crackers.

The *Journal of the American Medical Association*[2] gives some useful suggestions for the treatment of this condition. With the beginning of abdominal disturbance the possibility of typhoid fever, dysentery, appendicitis, and infection of the kidneys should be borne in mind. During the course of the diarrhœa the symptoms of acidæmia and of meningeal complications should be watched for. Eruptions due to food poisoning, and other protein poisoning, or to drugs, may be present. Sources of local infection should be sought for; they *may* be found in the tonsils or the ear, or perhaps as a serious bronchitis or other lung condition. It should be recognized that streptococcal focal infections may cause diarrhœa.

The child should always be kept in the fresh air and outdoors—in the shade if the weather is hot. If possible, a speedy removal to the seaside or the country is advisable. This measure should not be postponed until the child is hopelessly ill. **Castor Oil** should be given. Food should be withheld, but plenty of water allowed. If the child cannot retain water in the stomach, after a colon wash-out it may be retained in the bowel. If water is continually lost by the body and cannot be retained in the stomach or colon, it is advisable to give it hypodermically, for many a diarrhœal patient dies from lack of water. In twenty-four hours (sooner if the patient is very weak), **Lactose**

in from 3 to 5 per cent solution in water should be given. If the patient shows signs of acid-intoxication, **Starch Water** and **Sodium Bicarbonate** should be administered in small frequent doses; then oatmeal gruel may be used. If there are frequent small stools with tenesmus and pain, the lower bowel should be washed out very gently with 0·7 per cent **Sodium Chloride** solution once or twice daily. If it causes prostration it should be stopped.

While these treatments are in progress, the stools should be examined for bacteria. If the gas bacillus is found, **Bulgaria Bacilli Tablets** may be crushed and administered in sugar and water or in whatever nutriment is being taken. If the stools are fœtid, and especially if there is a tendency to incomplete evacuation of the bowels, small doses of yeast may be employed, in water, in the form of one-twentieth of an ordinary yeast cake, once a day. **Phenyl Salicylate,** in 0·03-grm. doses for a child one year old, may be given every three hours for a day or two, and then every six hours. Older children require a larger dose. If there is much irritation of the stomach or upper intestine, **Milk of Bismuth** may be administered, but should not be continued for too long, and is valueless by the mouth for colitis.

If the child is hot it should be sponged with tepid water and kept cool. If it is cold it should be kept warm with dry heat. Antipyretics are not called for. A good rule is to keep the abdomen warm and the rest of the body cool. If stimulation is required, very small doses of **Atropine,** or of **Strychnine,** or of both, may be given. If constipation occurs and the bowel condition is troublesome, another dose of **Castor Oil** may be ordered. The mouth should be kept clean, but all manipulation must be gentle. The usual antiseptic precautions are necessary for nasal or oral secretions, for the diapers, and for cleansing the clothing and bed linen. It is advisable to smear the anus and buttocks with petrolatum: it prevents irritation from the evacuations, and is not conducive to bacterial growth.

As soon as advisable the food should be increased by malted foods or malted gruels and—later—pasteurized milk; but the diet should be kept low until the fever ceases and the stools are less frequent and contain no blood. A gradual return should be made to regular milk or mixed diet. Occasionally, when all measures seem powerless, if the child is bottle-fed, a wet nurse may save its life. If the baby is breast-fed, the mother's milk may be at fault, and all other possible sources of infections should be sought.

References. —[1]*Jour. Amer. Med. Assoc.* 1916, ii, 1562; [2]*Ibid.* 1917, ii, 645.

DIPHTHERIA. *E. W. Goodall, M.D.*

J. D. Rolleston[1] gives an account of *isolated nasal diphtheria*, i.e., diphtheria originating in and confined to the nose, derived from a study of 55 cases coming under his care at the Grove Fever Hospital. They occurred amongst 3000 cases of diphtheria, an incidence of

1·5 per cent. The disease is most frequent in young children and in the winter. Congenital syphilis is a predisposing cause. The great majority of cases run a mild course, but rare examples of toxæmic diphtheria confined to the nose undoubtedly do occur. Rolleston follows De Stella in believing that the habitual mild course is due to auto-immunization. [I am inclined to follow Concetti and others in attributing the benignity to the slight absorption of toxin that takes place from the nasal passages.—E. W. G.] The disease is prone to be chronic. The most common early symptoms are headache, sore throat, shivering, and vomiting. In twenty cases there were no symptoms beyond the nasal discharge. The discharge may be watery, sanious, or purulent. Occasionally only dry crusts are to be seen. In fifteen cases membrane could be seen in the nostrils without the aid of a speculum. Redness and excoriation of the alæ nasi frequently occur. There may be pyrexia and some enlargement of the cervical and submaxillary glands. As a rule there is no general disturbance. Complications are rare; there were thirteen cases of albuminuria, two of otitis, and one of cyclopegia. The prognosis is good; all the cases recovered except three, which were infants a few weeks old, suffering also from congenital syphilis. Treatment is by the subcutaneous injection of diphtheria **Antitoxic Serum,** 1000 to 12,000 units.

Rolleston discusses the diagnosis between nasal diphtheria and fibrinous rhinitis, and is of opinion that "the term 'fibrinous rhinitis' should be reserved for those comparatively rare cases in which this form of rhinitis is due to causes other than the diphtheria bacillus." [In other words, the diagnosis ultimately rests with the bacteriologist. Where membrane or fibrinous exudation can be seen, it is always advisable to treat the case as one of diphtheria.—E. W. G.] A full bibliography is appended to the paper.

In a critical discussion of *diphtheria of the larynx in adults*, J. D. Rolleston[2] gives a very full bibliography of the subject, and relates four cases which came under his own observation. The condition is rare; the four cases occurred among 1156 cases of laryngeal diphtheria admitted to hospital during a period of sixteen years, during which period 821 diphtheria patients twenty years of age and over were admitted. Writers, almost without exception, agree as to the gravity of this form of diphtheria. It is very insidious, and, until the small bronchi are invaded, gives rise to no symptoms calculated to alarm the patient or his friends. For some time aphonia may be the only sign, and the larynx and trachea may be involved in an adult without even the presence of aphonia. The onset of aphonia should lead at once to a laryngoscopic examination, and the use of antitoxin, if that has not already been given. Once dyspnœa has set in, both the antitoxin treatment and tracheotomy are of no avail. Not infrequently sudden death occurs.

It is well established that diphtheria may begin in, and be confined to, the larynx, and that thence it may spread to the trachea and

bronchi; it is not so well established that from the larynx the membranous inflammation may spread upwards to the pharynx and tonsils; such a course is generally held to be unusual. It is commonly held to be still more unusual for the disease to begin in the bronchi and trachea and spread upwards to the larynx and fauces. In a paper entitled "Tracheobronchial Diphtheria," H. L. Lynah,[3] of New York, maintains the thesis that the great majority of these membranous stenoses [of the trachea and bronchi] travel from below up. For his proof he relies upon the history and clinical symptoms, but especially upon a bronchoscopic examination on cases recognized prior to the third day of the disease.

The physical signs are those of obstruction of the trachea, or one or both main bronchi, or their branches. The chest is barrel-shaped (ballooned), on the affected side only when one bronchus is involved. There are retraction of the sternal notch, sinking in of the epigastrium, and cyanosis of the finger-tips. There are also emphysema and atelectasis, with hyper-resonance on percussion; or extensive collapse. The respiratory murmur on the affected side is diminished, while on the unaffected it is very harsh. "One of the best and the most accurate auscultatory signs is elicited by placing the bell of the stethoscope firmly on the trachea in the sternal notch, with the head well retracted. At this site there are no transmitted râles, and one can often hear a 'flip-flop' sound due to a loosened piece of membrane which is blocking respiration." Onset is gradual, and the dyspnœa progressive: the voice is never lost; occasionally there are slight stridor and a cough. The condition is often diagnosed as bronchial catarrh or bronchopneumonia. Cultures are of little value in settling the diagnosis, because the fauces and larynx are free. The diagnosis is decided by the use of the laryngoscope and bronchoscope. The writer states that there is little shock accompanying a bronchoscopic examination in children suffering from this form of diphtheria.

Treatment.—Mechanical removal of the obstructing membrane through the direct laryngeal speculum and bronchoscope is not at all difficult if the case is recognized fairly early; and the removal is readily accomplished by means of "the small **Suction Tube** attached to the small spray and vacuum pump made by Sorenson, of New York City. . . . A vacuum of 5 in. is sufficient to remove all of the membrane, and causes little bleeding. . . . After the foreign body has been removed, the whole of the tracheobronchi are sprayed or swabbed with **Antitoxin** locally, followed by intubation with long tracheobronchial tubes." The writer is accustomed in children to leave the bronchoscopic tube in the bronchus for from fifteen to thirty minutes after spraying with antitoxin. The long intubation tubes can usually be removed within seventy-two hours, and then never require to be replaced.

[Lynah's paper is highly interesting. He describes a method of diagnosis and treatment for tracheal and bronchial diphtheria which, so far as I am aware, has not been practised in the United Kingdom.

Appended to his paper is a detailed account of 39 cases in which the method was employed. In 26 of them, however, it does not seem to me that it has been proved that the false membrane commenced in the trachea or bronchi and spread upwards; the cases are equally open to the interpretation that the membrane attacked the fauces or the larynx first; and in my opinion the same interpretation may be put on some of the remaining 13 cases, in spite of the fact that when first brought under medical observation no exudate could be observed above the trachea. Fifteen of the cases were fatal; but one of them died on the way to the hospital, and some soon after admission, and as they were all cases in which the trachea and bronchi were involved (whether primarily or not does not matter), the results of treatment must be considered to be good. All the cases except two occurred in children. The application of diphtheria antitoxin locally appears to be of doubtful value.—E. W. G.]

For the treatment of *septic sore throat, inflammation of the fauces in scarlet fever*, and *faucial diphtheria* J. M. Beattie, F. C. Lewis, and G. W. Gee[4] advocate spraying or swabbing with **Hypochlorous Solution** electrically produced from hypertonic saline, which they believe to be more efficacious than hypochlorous solutions prepared by other methods. The solution was made by passing an electric current through a 3 per cent solution of common salt, and using graphite plates as electrodes in the solution. They give a description of a simple apparatus which can easily be installed in a house or institution lighted by electricity. The chief chemical agents produced are hypochlorous acid and sodium hypochlorite. They state also that this solution is very efficacious in ridding the fauces of diphtheria bacilli, and is therefore useful in the treatment of carriers. The solution can also be employed most advantageously in the treatment of septic wounds.

Prophylaxis.—The treatment of diphtheria carriers by insufflations of powdered **Antimicrobic Serum** is strongly advocated by R. Benard,[5] as a result of trials on a number of cases in an epidemic in Nevers during 1916. The powder, prepared at the Institut Pasteur, Paris, consists of dried and powdered antidiphtheritic serum, 10 grms.; novarsenobenzol Billon, 0·9 grm.; powdered gum benjamin, 1 grm.; carbonate of bismuth, 100 grms. This powder is insufflated into the nostrils three or four times a day. According to Benard this method is much more efficacious than any other in quickly rendering the nasal passages and pharynx free from bacilli.

Garlic thought to be a prophylactic (p. 15).

References.—[1]*Brit. Jour. Child. Dis.* 1917, Jan.-March, 21; [2]*Clin. Jour.* 1916, Nov. 389; [3]*Laryngoscope*, 1916, Oct., 1193; [4]*Brit. Med. Jour.* 1917, i. 256; [5]*Presse Méd.* 1917, May, 275.

J. S. Fraser, M.B., F.R.C.S.

Intubation of the Larynx in Private Practice.—Cartin[1] presents an analysis of 350 cases of laryngeal diphtheria occurring in private practice in Johnstown, Pa., a centre of vast steel and mining

industries, with a large population of labouring people, both native and foreign. Of the total, 182 were males and 168 females. For operating, Cartin and his colleagues used the kitchen table, a bed, or two chairs, while a parent or neighbour held the patient. The children themselves had no nursing, and many of them played as usual with the other children. Cartin uses O'Dwyer's instruments, with hard rubber tubes, and intubates with the child in the dorsal position. He always removes the string because it irritates the pharynx and causes persistent cough. Cartin always employs the tube indicated for a child from six to twelve months older than the patient he is operating on, because it is less liable to be coughed up from the first to the third day. After this the accident is not to be feared.

Fifty-seven per cent of the patients received from 10,000 to 20,000 units of **Antitoxin.** Latterly, since free antitoxin has been provided, Cartin has injected a single dose, graduated according to the severity of the case, and varying from 15,000 to 50,000 units. The antitoxin is given intramuscularly in the gluteal region.

The intubation tube was worn for five days by 223 of the 350 patients. Those wearing the tube for this length of time were less likely to require re-intubation than those extubated earlier. After removing the tube, Cartin always remained with the patient until all danger of returning stenosis was passed—usually about two hours. Rarely did a case require re-intubation after this time. He has never had occasion to use the Casselberry method of feeding, and for stimulation he relies mainly on **Caffeine** or **Sodium Benzoate.** In septic cases **Mercuric Chloride** was used, together with **Whisky or Brandy.** Among the 350 cases there were no chronic tube cases and none requiring tracheotomy. The youngest patient was seven months old, and the oldest a woman, age 34. Many patients complained of earache. In three cases the tube became blocked and casts were coughed up immediately after extubation. Many of the cases of laryngeal diphtheria were secondary to a pharyngeal affection in other members of the family, but the reverse rarely occurred. Only 32 cases required re-intubation; in one of these it was necessary five times. Permanent disturbance of phonation never occurred, but in the case just mentioned the voice only became clear after seven months.

Of the 350 patients, 48 died—a mortality of 14 per cent. One child died of cardiac paralysis seven days after extubation. Another child, while playing in the yard on the fourth day, coughed up the tube, and was dead before the mother was aware of the accident. The most frequent cause of death was diphtheritic pneumonia (27 out of the 48 deaths). Cartin advises intubation when the diagnosis is clear and positive, as indicated by the voice and cough, beginning dyspnœa, and increasing distress in spite of treatment. He never waits until conditions become alarming. No patient was lost in which intubation was performed early. Contrary to the prevailing opinion, he finds extubation easier to perform than intubation.

Diphtheria of the Larynx in Adults.—Rolleston[2] states that 'croup' is as fatal in the adult as in the child. He says that it is indeed remarkable how large a proportion of the recorded cases of croup in the adult have occurred in pregnancy, both before and since the publication of Caneva's thesis. Begbie noted that comparatively few of the recorded cases of croup in the adult were examples of the disease occurring as a primary affection. In the great majority it was a secondary affection, coming on in the course of some other severe disease by which the strength of the patient had been greatly reduced. Archambault has pointed out the hopelessness of tracheotomy in adult cases, owing to the extension of the membrane to the ramifications of the bronchi. Tissier remarks that through want of laryngoscopic examination many cases may escape notice and be responsible for the spread of infection. Ruault has drawn attention to the frequency of a 'latent supraglottic croup.' The membrane passes from the tonsils to the base of the tongue, the epiglottis, and the vestibule of the larynx. In such cases the patient frequently presented no laryngeal symptoms.

Antitoxin treatment has but little affected the prognosis of laryngeal diphtheria in adults.

References.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 460; [2]*Clin. Jour.* 1916, Nov. 1.

DRUG ERUPTIONS. *E. Graham Little, M.D., F.R.C.P.*

Lane[1] describes a case of probably mixed type, iodides and bromides having been given together, and the eruption partaking of characteristics of both drugs. The patient was a child, age five months, who had been taking for three weeks previously 8 gr. of bromide daily, and for a week previously 4 gr. of potassium iodide. The eruption was seen in two stages, a vesiculobullous lesion and a vegetating condyloma-like mass, the face and the buttocks being chiefly affected.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 1695.

DRUG HABITS. (*See* Alcoholism and the Drug Habit.)

DUODENUM, DILATATION OF. *Robert Hutchison, M.D., F.R.C.P.*

Vanderhoof[1] believes that chronic dilatation of the duodenum, due to compression of its terminal portion by the root of the mesentery, is a clinical entity with definite symptoms, and is often met with in cases of visceroptosis. He groups the symptoms as follows: (1) Persistent, or recurring, vomiting. *In most instances the vomitus contains bile, often in considerable quantity.* (2) Pain in the upper part of the abdomen, generally referred to the right hypochondrium. As a rule, this is described as an aching or dragging pain, but it may be severe, so as to suggest biliary colic; or, in other instances, it simulates the pain of peptic ulcer with irregular food-relief. (3) 'Habitus enteroptoticus,' often associated with exaggerated lordosis. (4) Obstinate

constipation is the rule, although this may not be a feature of the case. Occasionally the stools are colourless and relatively free from bile. (5) Vague toxic symptoms are common. Headache is frequently a prominent symptom. These patients appear to be peculiarly sensitive and of an unstable nervous temperament. In marked cases starvation with acidosis develops and leads to a fatal termination. Gall-stones, gastric ulcer, and hysterical vomiting are all apt to be simulated. The treatment is that of visceroptosis. **Gastric Lavage** helps. In a few cases operation may be required.

REFERENCE. [1]*Jour. Amer. Med. Assoc.* 1917, ii, 510.

DUODENUM, SURGERY OF. (*See* STOMACH AND DUODENUM.)

DYSENTERY, AMŒBIC. (*See* AMŒBIASIS.)

DYSENTERY, BACILLARY. *Sir Leonard Rogers, M.D., F.R.C.P.*

ETIOLOGY.—J. H. H. Piric[1] isolated dysentery-like bacilli from 35·7 per cent of 56 cases of dysentery in East Africa, where he found this form to be much commoner than the amœbic one. The most frequent variety was Morgan's bacillus, and the next Flexner-Y bacillus, while Shiga's organism was only occasionally found. He treated a number of the severer cases with Lister Institute serum (D23, D24, and D25), but saw no benefit from it. J. Cunningham and H. H. King[2] report on an investigation of gaol dysentery in Eastern Bengal. Clinically they classified the cases as: (1) Acute fulminating, of which he did not see any cases; (2) Subacute, which formed the largest proportion (77·7 per cent), and readily yielded to treatment; and (3) Chronic, which repeatedly relapsed, and accounted for nearly all the mortality, the cases steadily losing weight and sometimes becoming dropsical. Microscopical and bacteriological examinations were made with negative results in 33·8 per cent. Of the remaining 66·2 per cent, dysentery bacilli (types not recorded) were found alone in 57·3 per cent, and amœba alone in only 5 per cent, while in 3·8 per cent both organisms were present. They give reasons for thinking the majority of the negative cases were slight or chronic bacillary cases. In a further paper[3] the same observers report that out of 96 strains of dysentery bacilli 89·6 per cent were mannite fermenters and only 10·3 per cent non-mannite fermenters. The sugar reactions of the former group especially were very variable from time to time, and they agree with other recent workers that the sub-division of the Flexner group by these tests is not sound. Complete serum reactions were obtained with 79 per cent with a Flexner serum, while 72·6 per cent of their cases gave definite agglutination reactions.

C. J. Martin, Kellaway, and F. E. Williams[4] record results of bacteriological examinations in 217 cases in a Cairo military hospital. Shiga's bacillus was found 47 times and mannite-fermenting bacilli 76 times. The sugar reactions of the latter were so unstable that

they consider it useless to subdivide the mannite-fermenting group by biochemical sugar tests. For agglutination work they found Y serum the most useful, but organisms of the Flexner group not agglutinating with dysentery serums may still give a reaction with the blood of the patient they have been recovered from, and are therefore true dysentery bacilli.

PREVENTION.—H. G. Gibson[5] made an experimental investigation on **Vaccination** against dysentery with a view to obtaining a non-toxic method. Sensitized vaccines did not produce much antibodies, and caused severe reactions. Vaccines made by treating the bacilli with eusol gave better results when used within fifteen days of their preparation, but produced dangerous reactions after being kept for six weeks. He then used dead dysentery bacilli combined with an 'absorbed' antidysenteric serum, made by incubating at 37° C for four hours a Shiga serum with Shiga's bacillus, and separating the serum subsequently from the bacilli. By this combination he had fairly mild reactions, while the animals and patients developed antibodies and immunity. The method is now being applied in man.

DIAGNOSIS.—C. T. Holland,[6] who reports on *x*-ray examination after bismuth meals, found it to be useless for diagnostic purposes.

TREATMENT.—G. A. Finlayson[7] urges the necessity of microscopical examinations in every case of dysentery before treatment is begun, and that emetine should only be given when the amœba has been found. *Non-amœbic* cases should be treated with full doses of **Anti-dysenteric Serum,** 100 c.c. being given intravenously without delay in severe cases, repeated if necessary after twenty-four hours. Subsequently 40 c.c. doses may be given subcutaneously. Salines are also administered. Intense relief was afforded within twenty-four to thirty-six hours; the temperature fell to normal in from two to six days, with relief of all the symptoms. Urticaria, serum rashes, and occasionally synovitis may result from the serum. J. B. Fisher[8] allows only albumen-water, barley-water, and lemon-water for the first forty-eight hours. Milk is only given later in the form of pudding or custard. Stimulants may be required in fulminating cases. He gives the serum in a dose of 80 c.c., followed by 60 or 40 c.c. doses, in the flank, and also uses the saline treatment. Out of 183 acute cases, only one death occurred—in an emaciated subject. T. J. C. Evans[9] uses the **Saline Treatment,** and if improvement does not quickly result he goes on with 10-gr. doses of bismuth salicylate and salol three times a day, returning to salines after three or four days if necessary. In chronic forms he tried appendicostomy and irrigation with eusol with temporary improvement, but the final results were not good.

REFERENCES.—[1]*Jour. Hyg.* 1917, Feb., 565; [2]*Ind. Jour. Med. Research,* 1917, Jan., 441; [3]*Ibid.* 1917, *July,* 96; [4]*Ibid.* 1917. April 14, 479; [5]*Jour. R.A.M.C.* 1917, June, 615; [6]*Ann. Trop. Med. and Par.* 1917, Feb., 357; [7]*Brit. Med. Jour.* 1917, i, 46; [8]*Ibid.* 43; [9]*Ibid.* 418.

DYSMENORRHŒA. *W. E. Fothergill, M.D.*

Happel[1] says that the extract of **Corpus Luteum** relieves dysmenorrhœa not due to a pathological lesion in young girls and nulliparæ. Benefit in nausea and vomiting of pregnancy has been reported. It is the best remedy for the relief of the nervous symptoms of the natural menopause, and for their prevention and relief in post-operative menopause. It is of the greatest value in the treatment of irregular or scanty menstruation in young women, and alleviates the neurasthenic symptoms so often associated. Extract of corpus luteum must be given over a long period and in sufficient dosage, according to the needs of the patient. It produces no toxic effect, except a feeling of fullness of the head or vertigo, and is not cumulative. The only disadvantage is the cost, which precludes its use in many cases where it is strongly indicated.

Reference.—[1]*Med. Rec.* 1917, i, 848.

EAR AFFECTIONS, INTERNAL SECRETIONS IN. (*See* Internal Secretions.)

EAR, DISEASES OF. (*See also* Vertigo.)

John S. Fraser, M.B., F.R.C.S.

Middle-ear and Mastoid Disease.

Primary Carcinoma of the Middle Ear.—Newhart[1] states that primary carcinoma of the middle ear is very rare. Up to 1910 less than fifty authenticated cases had been recorded. It runs a rather rapid course. The interval from the first symptom to the time of death varies from eight to eighteen months, with one year as the average. Death is caused by meningitis, brain abscess, hæmorrhage, or exhaustion, or by the direct extension of the growth to the vital centres. The only effective treatment consists in thorough operation, though some writers advise against all interference. Operation at least results in relief of pain, even if the relief be only temporary. Newhart has been unable to find any positively successful result from the use of radium or the *x* rays.

Stereo-Röntgenograms of the Mastoid.—Ingersoll[2] says the only way to acquire skill in interpreting the mastoid radiogram is by practice and study. The following structures can thus be definitely located: the external and internal auditory canals, all the mastoid cells, the mastoid antrum, the semicircular canals, the groove of the lateral sinus, and the jugular bulb. The plates should be placed in the stereoscope so as to show the mastoid from the outside, that is, with the film side toward the observer. Then, by reversing the plates in the stereoscope, i.e., turning the smooth side of the plate toward the observer, the mastoid is seen from the inside of the skull. Normal mastoid cells transmit the rays better than those that are inflamed.

Lumbar Puncture in Mastoid Disease.—Ryland[3] submits the following reasons in favour of the routine employment of lumbar puncture

in all cases of acute infective aural disease upon which it has been decided to operate: (1) It is highly desirable to know whether or not the spinal fluid is turbid. The procedure is dangerless, and is quickly and easily performed. A specimen of the spinal fluid should be obtained as soon as general anæsthesia is complete, and before the operation begins. (2) In certain instances the tissue reactions fail, and the middle-ear infection proceeds with great rapidity to an intracranial and meningeal infection. If we know, before beginning to operate, that the fluid is turbid, and from the actual operation that tissue reaction has failed, it becomes clear that we are dealing with a case of grave nature. It is better to obtain this knowledge at the time of the operation, when possibly a prompt trans-labyrinthine drainage may be successful. (3) It is probable that a certain proportion of cases, which begin to manifest signs of meningitis after an aural operation, have been in reality cases of meningeal infection for hours, or even for days, before the operation. (4) Lumbar puncture would establish the frequency of meningitis serosa. It might result in a more complete elucidation of the condition itself. (5) The procedure would afford a safeguard of some value to the reputation of the operator.

Mastoiditis and its Complications.—Downey[4] reports 92 cases of mastoiditis. The mortality was 10 per cent: meningitis, 3 cases; cerebral abscess, 2 cases; cerebral tuberculosis, 3 cases: general septicæmia (scarlet fever), 1 case; lobar pneumonia, 1 case. In a case of acute suppuration of the middle ear there should be no mastoid tenderness or fever after three days of free discharge. The otorrhœa should cease within ten days. A persistent pulsating discharge which remains profuse in spite of frequent cleansing indicates that the mastoid antrum is involved. After the initial rise in acute purulent otitis media, the temperature is seldom high in an uncomplicated case of mastoiditis after drainage from the middle ear is established. In vague cases laboratory examinations prove of marked service—e.g., a differential count of the white blood corpuscles showing increase of the polymorphonuclear cells indicates pus. Even a simple count has been of marked service. *The high leucocytosis of general infections is not found in uncomplicated mastoiditis.*

Marked symptoms of mastodiitis, which are present in the very early stages of an acute purulent otitis media, clear up almost immediately when free drainage has been established. A few, however, continue to exhibit alarming symptoms for from one to three days after a myringotomy. A wait of twenty-four to forty-eight hours will often show an abeyance of the fever and tenderness. If, after three days, the symptoms are still marked, discretion may become a matter of 'taking chances.' In these acute cases, one must not expect to find quantities of pus or cellular destruction—intense congestion of the bone may be all that is present. Toxic symptoms often persist for several days after the mastoid process has been fully opened. This is the most dangerous type of mastoiditis. There are two

methods of completing the operation for mastoiditis in cases of acute otitis media. One is to clean out the bone, pack with gauze, and leave the wound completely open. The other is the 'blood clot' method developed by Reik, of Baltimore. The wound is allowed to fill with blood, and the skin incision is sewed up completely, with the hope that it will heal by first intention. The first method takes six weeks, with a resulting depressed scar. In the second method healing is complete in one week, and there is a hair-line scar. There is no midway method. Of 70 cases, Downey sewed up the skin completely in 45: 14 (31 per cent) healed absolutely by first intention: 10 broke down partially; 21 broke down completely. It is not the very early case that heals by first intention, but that of from three to six weeks' duration, in which there is free pus and a breaking-down of the mastoid cells. The explanation is as follows: In the early stages of mastoid infection there is an intense congestion of the bone—the cells are not broken down, but are filled with serous exudate. After the complete removal of the cellular structure, the inner table of bone is found markedly congested: there is as yet no line of demarcation between healthy and diseased tissue. Both local and general resistance is insufficiently established. In the later stage we find much less congestion, the cells are broken down, and there is an abundance of free pus, granulations, and necrotic tissue. When this is cleaned away, we have a white non-bleeding inner table of bone. The general resistance has been established, and we get rapid healing. It is not uncommon in children to have an old mastoid wound break down during a re-infection of the middle ear, even years after the first operation.

Results of the Radical Mastoid Operation.—Many otologists hold that the radical mastoid operation is still on trial. Harris[5] states that twenty-seven years have elapsed since the operation was introduced by Küster for the complete removal of all disease. It is indicated when cure by other means is found to be impossible. The Schwartze operation, while successful in cases of an acute nature, often fails to cure chronic suppurative processes.

Dench,[6] in discussing Harris's paper, states that he would be ashamed if able to show only 50 per cent of cures. Among his 734 cases not a single death can be attributed to the operation. If the patient has poor hearing with no nerve lesion, the hearing will probably be improved by operation. If the hearing is only moderate, it will probably be the same after operation. If, on the other hand, it is very good, it will probably be somewhat impaired by the radical procedure. With regard to the *cure of suppuration*, Dench says that in cases where the discharge persists for months after operation he would certainly operate again. In private cases all discharge usually disappears in two to four weeks, and the patient can be sent out of the city at the end of two weeks with perfect safety. The subsequent treatment is so simple that it can be carried out by the patient or any general practitioner. The use of a primary

skin-graft certainly shortens the period of convalescence. It should be used in all cases, with very rare exceptions. If both ears are suppurating, Dench operates on the deafer ear first. If, after the discharge ceases, the hearing in this ear is good enough for the patient to follow his vocation, the opposite ear is then operated upon if necessary. In a case of total deafness on one side with suppurative otitis media on the other, Dench hesitates to operate unless the symptoms are very acute. The result of the operation is greatly influenced by the technique. A middle-ear discharge confined to the Eustachian tube is not dangerous, and will not lead to any intracranial involvement. The operator, however, prefers to secure a perfectly dry ear. Dench holds that it is impossible to say by looking at an ear just which cases are dangerous. For this reason the radical operation should be performed in the majority of cases of chronic suppuration.

Yankauer[6] claims that 52 per cent of cases of chronic middle-ear suppuration are cured by curetting the Eustachian tube, while the hearing is improved in 90 per cent. Only in those cases where curetting fails should the radical operation be done.

Lederman[6] holds that in recent years the tendency to perform the radical mastoid operation has certainly subsided. This is due to the fact that acute suppurative otitis media is now receiving more prompt and better treatment.

Hexamine is suggested in cases of aural suppuration (p. 16).

Richards[6] finds that in the unhealed cases the area giving trouble lies anterior to a vertical line dropped through the facial ridge. The front part of the cavity is crowded with important structures, and it takes time and patience to acquire a technique which enables an operator to remove dead bone from this area without inflicting injury.

Modified Radical Operation.—Page,[6] in the same discussion, holds that it is better, before completing the radical operation, to investigate the antrum and mastoid cells and the attic region from behind, and to exenterate the tympanic cavity only if the disease leads one to it. He finds that there is sometimes a gradual loss of hearing after operation for no apparent cause; even with a clean dry cavity the hearing sometimes gradually deteriorates. Hayes[6] claims to obtain as good results from the modified radical as from the complete radical operation.

Graham Brown[7] claims that Charles J. Heath has shown that the mastoid antrum is invariably involved, and that this is the cause of the continuation of the discharge; that the passing of this discharge through the tympanum gives rise to swelling of the mucosa and a consequent damming off of the discharge. The pus is directed by these dams to the perforation in the drumhead, and thus into the external meatus. Swelling of the tympanic mucosa interferes with the proper action of the ossicles, and so gives rise to deafness. The aditus ad antrum is generally small, and easily becomes obstructed, thus producing an acute exacerbation of the mastoid disease. This is mainly manifested by pain in the ear. Pain, with or without cessa-

tion of the discharge, in a case of otorrhœa, is one of Heath's positive signs for operating. He treats the antrum by draining it through the external auditory meatus, and leaves the normal contents of the tympanum entirely alone. The earlier the operation is performed, the better the chance of saving the hearing.

Two objections have been raised to Heath's method: (1) That in acute or subacute cases it is not justifiable to perform such an operation so early, as some cases clear up by treatment with drops and syringing. Brown holds that this cessation of discharge generally occurs very shortly after the acute attack, and in a great proportion of these cases a relapse occurs. He further states that the usual operation for acute mastoiditis (Schwartze) may reasonably be discarded as not complete, because it does not allow complete surgical treatment of the antrum, aditus, etc., and does not give any information concerning the condition of the tympanic cavity. [Brown does not mention the fact that, in cases of large cellular mastoid, Heath's incision does not completely expose the whole diseased area and does not permit of the removal of the tip of the mastoid process—a procedure which is often called for in these cases.—J. S. F.] (2) The second objection to Heath's operation is that in chronic cases it will not cure necrosis of the ossicles or attic disease. Brown claims that many cases have been entirely cured by draining the mastoid antrum. Granulations have disappeared from the tympanum, perforations of the drumhead have closed, while cases of advanced necrosis, cholesteatoma, etc., have greatly improved. The writer admits that this improvement does not always occur, since delay has often resulted in the destruction of ossicles. Heath strongly advises early operation to avoid these all too frequent complications. The Heath operation can readily be converted into a complete mastoidectomy should the occasion demand.

Technique of Heath's Operation.—Unless the hair comes very close to the attachment of the auricle, it is left unshaven. Heath uses a rubber head-cover which only leaves an elliptical area exposed for operation. The anæsthetic is given with a Junker apparatus. The skin incision commences above, a little in front of the level of the anterior border of the meatus, and is continued round in the crease between the auricle and the mastoid process. It is continued for a greater or lesser distance into the lobule of the ear, as the case demands. After controlling all hæmorrhage, a careful dissection is made through the deep fascia. The sheath of the temporal muscle is left uninjured. A straight incision is now made through the pericranium from the region of the suprameatal spine, and carried horizontally out for about three-quarters of an inch, meeting the skin incision, which has been stretched backwards. A curved incision is next made along the posterior border of the bony meatus, and a third incision is carried from the lower border of the meatal incision parallel to the first incision and as far backwards as the skin will allow. This pericranial flap is then raised by means of Heath's elevator. The

flap, together with the posterior skin margin, is gathered up and drawn back by Heath's clip. The area of bone thus exposed ($\frac{3}{4}$ in. horizontally by $\frac{1}{2}$ in. vertically) is all that is required. The coronet ligament, attached at one end round the cartilaginous meatus and firmly adhering at the other to the suprameatal spine, is next divided, and the cartilaginous meatus is separated from the bony meatus. The former is held forward by means of a special retractor. The exposed bone is now removed from below upwards with a broad gouge, the detached pieces being lifted out with forceps. If there is a posterior perforation in the drumhead, a suitably bent thin silver probe is passed through it into the antrum. After opening the antrum, the operator again verifies his position by using the probe in the reverse direction. All involved mastoid cells are taken away, and the mucous membrane of the antrum and aditus is removed by suitable burrs. If necessary the cavity is swabbed out with pure carbolic acid. The bridge of bone between the antrum and the meatus is now removed to within $\frac{1}{4}$ in. of the tympanic ring. In some cases the floor of the bony meatus must be bevelled down to the level of the bony cavity in the mastoid. During this stage Heath protects the drumhead by using a shield. The meatal flap is now cut as follows: The cartilage is punctured with a special knife, and the incision carried upwards and outwards well into the concha so as to allow a drainage tube of large calibre to be left in position without causing pressure pain. Before the drainage tube is introduced, a cannula is inserted into the aditus through the antrum, and through this, air, and sterile normal salt solution later, are forced through into the tympanum to dislodge the pathological contents of the aditus and attic. The pericranium is sutured, care being taken to avoid including the cartilage of the concha. The rubber drainage tube is now introduced through the enlarged external meatus so that it rests upon the bridge. The skin incision is brought together with fine silkworm gut. Finally a wet dressing is applied. On the next day the stitches are removed and the outer dressing is changed. After this a daily internal dressing is done. Heath insists that the surgeon should attend to these dressings himself, or see that only competent assistants act for him. Syringing is avoided as far as possible. Heath employs **Emulsion of Iodoform and Bismuth in Glycerin,** or a solution of **Zinc Chloride,** as the condition demands. The middle ear is inflated from the second day onwards—either by way of the antrum or by Valsalva's method. The rubber drainage tube must be frequently removed and cleaned. It may be necessary to use this tube for many weeks. Brown can vouch for the eminently satisfactory results obtained by the above method.

Intracranial Complications of Otitis Media.

Perisinus and Extradural Mastoid Abscess.—Blackwell[8] records 35 cases of this condition. The period of life most commonly affected was that between fifteen and thirty years of age. The streptococcus

was the most constant exciting micro-organism, being present in 20 out of the 35 cases. A staphylococcus was found in 4 cases, and a pneumococcus in 3. In 29 cases the aural discharge had existed for less than two months before operation. The mastoid bone was most frequently of the pneumatic type.

Blackwell first performs the mastoid operation, and then attacks the region of the abscess cavity. The reason for postponing this to the last is the ever-present possibility of accidentally wounding the sinus or dura. The hæmorrhage which follows a wound of the sinus might seriously embarrass the surgeon in subsequently removing the infected bone, and would at the same time expose the patient to a far greater risk of infection. The sinus plate is usually removed as far as the region where the underlying dura begins to appear normal; Blackwell holds that this is not necessary in every case. An iodoform gauze drain is now laid down to the antrum and abscess region. Finally the posterior wound is sutured from above down to within the last half inch, and a copious wet saline dressing is applied externally. Daily dressings are performed until the wound has almost healed. This usually takes place within fourteen to twenty-one days from the time of the operation. Half of the sutures are removed on the first day after the operation, and the remainder on the second day.

Otogenic Sinusphlebitis.—Holger Mygind[9] has treated 70 cases of this condition during the last ten years, with 60 per cent of recoveries. The condition occurs more frequently in males than in females (respectively 37 and 33). Körner's statistics show more than double frequency amongst males. Mygind found the bone most frequently attacked, though in 9 per cent the inflammation of the middle ear did not spread outside the walls of the mastoid antrum. In 23 out of 40 chronic cases cholesteatoma was present. In 30 out of 70 there was no anomaly whatever of the bony wall of the sulcus sigmoideus. In 16 there was neither swelling nor tenderness of the mastoid region. The surgeon who waits for these signs will, therefore, come too late.

Operation on the Jugular Bulb.—McCoy[10] states that in some cases of septic thrombosis of the lateral sinus and jugular vein, we find, even after excision of the anterior wall of the sinus, along with ligature or excision of the internal jugular vein, that we are still confronted with suppuration in the jugular bulb and the septic symptoms depending on it. At each dressing, pus wells up from the lower end of the sinus. It is important to remember that the jugular bulb is very small on the left side in about 70 per cent of individuals, and further that the glossopharyngeal, the vagus, and the spinal accessory nerves pass through the jugular foramen.

Otitic Cerebellar Abscess.—Out of 639 cases collected by Friesner,[11] 66 occurred in the first decade, 240 in the second, 193 in the third, and 140 were over thirty years of age. There is a small proportion

of cases of cerebellar abscess in which, although the labyrinth is the seat of a suppurative process, it is not the route of infection. In such cases the pathway is through the inner (posterior) antral wall when there is an extradural abscess. Cerebellar abscess may thus be divided into labyrinthogenic and non-labyrinthogenic. At least 50 per cent are the former.

Of 86 cases of cerebellar abscess collected by Braun[12] from the literature since 1907, 85 were due to ear disease. The abscess runs its course with practically no symptoms in 10 per cent of cases: in 14 per cent the symptoms are obscured by other otitic complications. In 42 per cent the diagnosis was very difficult on account of other intracranial complications. In cerebellar abscess, we have: (1) General symptoms due to (*a*) increased intracranial tension—headache, vomiting, drowsiness, slow pulse, optic-nerve changes, papillary changes, and paralyses of the cranial nerves (3rd, 6th, and 7th), (*b*) the inflammatory process within the brain, and the changes in the cerebrospinal fluid (fever and emaciation). (2) Symptoms of disturbed motility (localizing symptoms).

Of the 86 cases, 34 recovered and 52 died. [This rate of recovery is unusually favourable, and is due to the method of collecting isolated cases recorded in the various journals. Otologists—like others—prefer to put on record their successful results. If attention is paid only to those tables where an operator gives the results of *all his cases*, it will be found that the recovery-rate in cerebellar abscess is only about 33 per cent.—J. S. F.]

Suppurative Labyrinthitis.—From a study of the literature covering the past decade, Rott[13] comes to the following conclusions: (1) In acute diffuse suppurative labyrinthitis, a labyrinth operation should only be considered when symptoms of meningeal involvement supervene upon those of the labyrinthine infection. (2) In any other type of diffuse labyrinthitis, no labyrinth operation should be performed because of the labyrinthine condition *per se*. If, however, the middle-ear suppuration is of such a type as to present indications for the radical mastoid operation, then the radical mastoid operation should be immediately followed by the labyrinth operation. (3) The only conditions presenting labyrinth symptoms in which the mastoid operation alone is indicated are: (*a*) The condition of perilabyrinthitis, in which the labyrinth itself has not yet become involved; and (*b*) The circumscribed variety of labyrinthitis (fistula). An exception, however, must be made in those cases which continue to give rise to incapacitating symptoms of vertigo, and in which hearing in the other ear is good. In this condition the labyrinth operation is indicated. (4) Should the stapes be dislocated accidentally during the radical mastoid operation, or should the appearance of the labyrinth capsule (as pus exuding from the oval window) draw attention to the possibility of a labyrinthitis, then the safer course would be to open the labyrinth at once.

Labyrinthine Focal Infections.—Macleod Yearsley[14] states that he

has met with a number of cases in which labyrinthine disease has arisen without any definite general disease or middle-ear trouble to account for it. We may have vertigo alone, nerve deafness with or without tinnitus, or vertigo and deafness. When the cochlea alone is affected, nerve deafness and tinnitus arise. At times, the deafness progresses by acute attacks, tinnitus being more marked after each exacerbation. When the vestibular apparatus alone is attacked, disturbances of equilibrium are the chief symptoms. Ménière's syndrome is present only when the whole internal ear is involved. Shambaugh has recognized the similarity between these phenomena and the chronic degenerations which occur as the result of focal infection, e.g., chronic arthritis and neuritis, chronic nephritis, and cardiovascular changes. We have only to assume that the endings of the eighth nerve may be the structure peculiarly susceptible to the bacteria [or toxins—J. S. F.] liberated from the infected focus. The possibility of a septicæmic infection of the internal ear of focal origin being admitted, there is a good basis upon which to found treatment. Shambaugh states that infected foci are usually in the faucial tonsils or in abscesses around the teeth. The intestinal tract and the nasal fossæ may also be possible sources of infection.

Treatment of Tinnitus and Middle-ear Deafness.—Realizing the futility of attempting to cure tinnitus of long standing, or middle-ear deafness, by catheterizing the Eustachian tubes, Sobotky[15] decided to experiment with **Radium.** Bruehl and Albrecht had previously applied radium applicators varying in strength from 2 to 23 mgrms. in the deeper part of the external meatus. The meatus itself was protected by a thin layer of tinsel paper, and the exposures lasted from 10 to 30 minutes. Radiation was repeated every eight days, and was interrupted after three exposures. Their conclusions were: (1) Radium does not benefit the hearing; (2) It improves and even cures tinnitus; (3) It disturbs the nerve mechanism without harming other structures; (4) It relieves dizziness. Sobotky himself used a 0·001 grm. radium sulphate applicator, the radium being enclosed within a glass capsule and connected to a flexible wire. The applicator was inserted unscreened into the external meatus and pushed inwards until it touched the drumhead. It was then held in place by a piece of cotton-wool. The first treatment lasted thirty minutes, and the following sittings were gradually increased up to one hour. In the 25 cases treated, the following results were obtained. As regards hearing: cured 0, improved 5, not improved 14, worse 6. As regards tinnitus: cured 1, improved 10, not improved 12, worse 2.

Deafness.—Harris[16] holds that we must admit that our success in combating deafness is in no way in proportion to what we have succeeded in accomplishing in the cure of suppurative processes in the ear. For those afflicted with severe deafness, auditory re-education by means of sonorous vibrations has been advanced by its advocates as offering the one encouraging means of relief. So far as physiology is concerned, the treatment rests upon a sound basis.

The cells of the body must functionate or degenerate. In subnormal hearing there is a reduced action of the entire auditory apparatus. Abundant evidence exists for the value of auditory re-education in the results constantly being obtained in the training of the other special senses, e.g., the education of the sense of taste in tea-tasters. Theoretically, the human voice is the ideal instrument for producing such an effect. It is not sirens, tuning-forks, nor watches which the deaf person desires to be able to hear, but conversation. For proper re-education the entire range of the ear for speech must be covered. This demands five voices—soprano, contralto, tenor, baritone, and bass. Moreover, the fatigue upon the voice used for the purpose of training makes it impracticable for actual employment. A proper mechanical substitute should comply with two conditions: it should be capable of reproducing tones covering in range at least five octaves, and the emission of sound should be of absolute regularity and of a constant intensity in all the registers. Six years ago Zünd Burguet devised an instrument, which he has named the '**Electrophone,**' which complies accurately with the requirements just enumerated. In its essential details, the instrument consists of three faradic hammers, whose lengths can be altered by means of levers, with telephonic ear receivers. Raoult reports 100 per cent of improvements in his 36 cases. Hubby reports 32 cases: his results are far from being as favourable as those of Raoult, but are sufficient to show the usefulness of the treatment in many cases of acute and chronic conditions of the ear. Harris's own investigations have been carried on entirely with an instrument known as the Meyer-Rowan apparatus. The observation of Hubby, that sonorous vibration benefits the condition of the Eustachian tube, has been repeatedly confirmed in Harris's cases. Of 8 cases of otosclerosis, Harris obtained improvement in 6. Of 12 cases of chronic catarrhal otitis media, improvement was secured in 11. Summarizing his 25 cases, improvement was obtained in 20, or 80 per cent.

Only after a course of treatment, given at intervals of three to five days, and covering a number of weeks, are we warranted in pronouncing it of no benefit. The cases where it is apt to be used are cases where all other treatment has failed. After benefit has been secured, maintenance of the improvement cannot be expected unless home treatment is continued, or a resumption of the treatment for a short time at proper intervals is carried out.

Educational Deafness and Deaf-mutism.—Kerr Love has pointed out that the so-called 'congenital' group of cases of deaf-mutism contains many individuals who were not really born deaf, but became deaf during the first two years of life, many of them being cases of meningitis. Further, of those cases which have been undoubtedly born deaf, there are two distinct classes, that of 'hereditary' and that of 'sporadic' deaf-birth. Macleod Yearsley[17] holds that otologists have paid far too little thought to the prevention of deafness. Hitherto so much attention has been given to the treatment of

middle-ear suppuration and its complications, that the great possibilities of prevention appear to have been lost sight of. The radical mastoid operation is too often performed without regard to the conservation of hearing which is important for the child's future. Otologists have endeavoured to obtain more rational and efficient treatment of the ear in fever hospitals, but their efforts have met with little success.

War Injuries and Neuroses.

Sohier Bryant[18] estimates that 80 per cent of the ear cases in the French Army show impairment of function sufficient to interfere permanently with the civil occupations of the patients.

The increase in large guns, shells, mines, and bombs accounts for the increase of ear injuries among the soldiers in this war. These injuries fall into three categories: (1) Rupture of the tympanic membranes. With appropriate care the ruptures heal without suppuration, and result in restoration of function in from five to twenty-one days. Even if suppuration occurs, convalescence is considerably shorter than in civil practice. (2) Complications of ruptured drumhead, such as mastoiditis and its intracranial complications. (3) Commotion of the eighth cranial nerve apparatus. The cochlear branches always suffer, the vestibular branches less frequently. Deafness and vertigo are common results. Bryant divides these cases into two groups: (*a*) The acute cases give the best prognosis, though complete restoration of function cannot be expected. The treatment consists in prolonged auditory rest, with general hygienic attention. (*b*) In the cases of nerve lesion of gradual onset no improvement can be anticipated. Finally, Bryant remarks that all forms of dry otitis (otosclerosis) are apt to increase rapidly under exposure to the excessive irritation of loud sounds.

In a paper based on the observation of a thousand cases of war deafness, Lannois and Chavanne[19] stated that prognosis depended on two factors: (1) *The previous condition of the auditory apparatus.* Men suffering from chronic suppurative otitis media, or well-marked otosclerosis, after commotion of the labyrinth by the bursting of shells, showed an incomparably greater proportion of deafness or impaired hearing than healthy subjects. (2) *The existence or otherwise of a direct injury to the skull.* Deafness is almost the rule in traumatic mastoiditis (about 95 per cent); frequent in traumatism of the branches of the facial nerve distributed to the ear; rare in fractures of the cranial vault. If there was no direct traumatism, concussion of the labyrinth was rarely followed by deafness. Acoustic exercises had no effect on deafness due to concussion of the labyrinth. Recourse must be had to lessons in **Lip-reading.** Great care must be taken to exclude malingering before giving a prognosis. The authors found simulation in 11 per cent of their 262 cases of pure labyrinthine concussion.

Got,[20] of Bordeaux, states that, in the great majority of cases, the

injury of the internal ear is consecutive to the bursting of a shell in the immediate neighbourhood of the patient. Beyond a distance of two or three metres the ear resists the aerial concussion, or the resulting labyrinthine disturbance is slight and likely to disappear rapidly. Both individuals who possessed healthy ears before the war and also those who started with defective ears, may get labyrinthine lesions. Patients starting with healthy ears are more often injured in their labyrinth than those with defective ears, as follows: traumatic labyrinthitis without objective lesions of the middle ear, 50·88 per cent; traumatic labyrinthitis with defects of the middle ear arising at the same time as the disturbance, 26 per cent: traumatic labyrinthitis with defects of the middle ear antecedent to the war, 24 per cent. [It should be noted that Got's experience differs from that of other observers. (*Vide supra*, Lannois and Chavanne).—J. S. F.]

Symptoms.—The predominant symptom is, (1) *deafness*, which may diminish in the weeks that follow the injury, but in some cases persists without modification for months. It may prove incurable. Got has never seen it increase. The deafness is always of the labyrinthine type. There is abolition of the cranial perception for the watch, diminution of aerial perception for tuning-forks—more marked for high than for low sounds, for the whispered than the spoken voice. Lateralisation of Weber's test to the sound or less affected side is shown. (2) The second important symptom is continuous *tinnitus*. (3) The third is *spontaneous nystagmus*: in the great majority of cases this is directed to the sound side, or to the side less affected (unless with complete destruction of the labyrinth, in which case the formula is inverted). (4) *Vertigo and disturbances of equilibration*, sometimes to the degree of falling, occur. These disappear at the end of several weeks, and always are the first to go.

Diagnosis.—Diagnosis from hysteria and malingering is generally easy. On the other hand, it is often extremely difficult to apply to some the label of 'hysteria,' to others that of 'simulation.' In the group of functional affections the deafness is absolute—"too absolute to be real." It is nearly always bilateral. Further, there is neither tinnitus, vertigo, nystagmus, nor disturbance of equilibration. Finally, the tone of the voice remains normal, which implies, knowingly or not, that they can hear themselves speak. How can hysterics be separated from malingerers? By catching the patient *in flagrante delicto* of fraud. Under the influence of the noise apparatus, the hysteric will sometimes preserve the tone of his voice, like the patient with organic disease; the unwarned malingerer will always raise it. The malingerer affects an air detached from the things of this world. The hysteric may show zones of cutaneous anæsthesia, a certain reduction of the visual field, and abolition of the pharyngeal reflex. The patient should be transferred immediately to the neuro-psychiatric service, if he is considered to be an hysteric. Got has had hysterical patients, educated by their stay in several hospitals, who presented disorders of equilibration.

Treatment.—Simple disturbances are cured in several weeks; others get slightly better or stop as they are. The disturbances of induced nystagmus (hypo-excitability) persist long. As to tinnitus, it remains unchanged and probably definite. A good number of cases of serious deafness due to organic lesion of the internal ear may be destined to remain permanent. Treatment is by absolute **Rest** and **Bromide and Iodide** (bromide 1 to 2 grm.). **Counter-irritation** over the mastoid in the form of cautery or leeches. Light diet. **Lumbar Puncture** in severe vertigo. No oto-massage. In the slight forms (commotio), after treatment for several weeks patients may return to the depôt; sometimes they are unfit to return to the front for two months. Severe forms are placed on reserve or half-pay temporarily, both renewable every three or six months.

J. S. Fraser and Capt. John Fraser[21] have microscopically examined the ear from four cases of shell or explosion deafness. The only changes of importance found were: (1) Rupture of the drumhead (three cases) and hæmorrhage into the middle-ear spaces; (2) Hæmorrhage in the fundus of the internal meatus in three of the four cases. In two cases the neuro-epithelial structures of the labyrinth appeared to be normal. In one instance the changes were possibly of post-mortem origin, but they appeared to the writers to be due rather to an early stage of 'degenerative neuritis.' It seems quite possible that in many cases of shell or explosion deafness one has to deal with a functional affection, as suggested by Milligan, Westmacott, and others. On the other hand, rupture of the drumhead and hæmorrhage into the middle-ear spaces must cause a certain loss of hearing; while hæmorrhage in the fundus of the internal meatus may give rise to deafness, tinnitus, giddiness, and other symptoms of an inner-ear lesion. It may be that the 'blow' to the ear due to shell explosion, and the associated loud sound, paralyze the delicate nerve-endings of the auditory apparatus, but no claim is made to have demonstrated this microscopically, except possibly in one case.

West,[22] and also Wilson, have found that the auditory field is contracted at both ends more or less symmetrically in cases of shell deafness. Wilson[22] noted that, in glancing wounds of the temporal region about the ear (without fracture, but with the pericranium involved), there was gross labyrinthine deafness. A large number of people who are said to be suffering from explosion deafness are really suffering from old chronic middle-ear suppuration without labyrinthine deafness or symptoms. In the earlier days of the war there were a large number of cases of pseudo-labyrinthine deafness which recovered spontaneously. Recently, these have been practically absent, and in their place there has been a stream of aphonics. These cases are largely due to suggestion.

The pupil reaction helps us to diagnose between real and simulated deafness. Any sensory stimulus will cause dilatation of the pupil. One should get an assistant to blow a whistle or a motor-car hooter behind the patient, and watch for dilatation of the pupil. We must

have the pupil contracted by light, and see whether it dilates on the sound being produced.

Jones-Phillipson[22] has analyzed 100 cases of war-injury of the ear. In 31 cases with laceration of the drumhead, the perforation occurred in the anterior-inferior quadrant in 20; in the postero-inferior quadrant in 6; between the two in 1; at the umbo in 2; in the posterior quadrants in 1; in the antero-superior quadrant in 1. Many of the patients stated that they were 'knocked out' or were unconscious, some remaining so for one or two hours. After this passed off the men were in a dazed condition. The more profound cases had lost the power of speech, and two or three of them could not see. The major conditions often passed off fairly quickly, leaving giddiness, which lasted for a long time. Jones-Phillipson found that they showed a horizontal or rotatory nystagmus on turning the eyes to either side. Caloric tests require three times as much water to prove a functionating or non-functionating labyrinth in cases at the front as in civil life, because these ears have been profoundly disturbed. In only two of his 100 cases did he find no response. Some labyrinths are profoundly depressed by the concussion, and are only slowly responsive. In a hurriedly-recruited army large numbers of men start military life as practically deaf men, and the increased loss said to be due to shell concussion can never properly be gauged.

Four cases of firm blood-clot in the middle ear were seen, bulging the membrane outwards. In one instance the membrane was quite intact. In two of these cases the patient reported that blood came into his mouth, and that he could taste it.

Deafness was very marked soon after the explosion, always most severe on the side exposed to the full force; when the shell burst in front or behind a patient, both ears were affected. The initial degree of deafness soon passed off. The noises were often noticed only later.

Shell-concussion deafness is possibly due to: (1) Cerebral concussion (these cases get well when the nerve shock passes off); (2) Overstrain and fatigue of the organ of Corti (a portion of deafness remains to be more or less slowly recovered from): (3) Temporary or permanent disorganization of the conductive apparatus (these are only slowly recovered from, if ever).

Exaggerated Auditory Motor or Jump Reflex, so-called Hyperacusis.—Hurst[22] states that a sudden noise normally causes an individual to jump and blink; at the same time his pupils dilate; the jump, at any rate, is a protective reflex, and represents the preparation for flight or fight. The motor part of the reflex is subcortical. In war neuroses in which the reflex is exaggerated, jumping continues during sleep and deep hypnosis, although the patient does not hear the noise which induces it. The reflex is abolished in complete hysterical deafness, so it must occur above the synapses, which are unswitched in this condition. This suggests that the reflex centre is in the posterior corpus quadrigeminum or medial corpus geniculatum, and the close relation of these centres to the blinking and the sympathetic

pupillo-dilator centre gives an anatomical basis for this view (*Fig.* 16). The very common exaggeration of this reflex in soldiers suffering from certain war neuroses is not, therefore, correctly described as hyperacusis. Actual hearing need not take place, as the reflex occurs when they are asleep and hypnotized; it is simply a part of the general

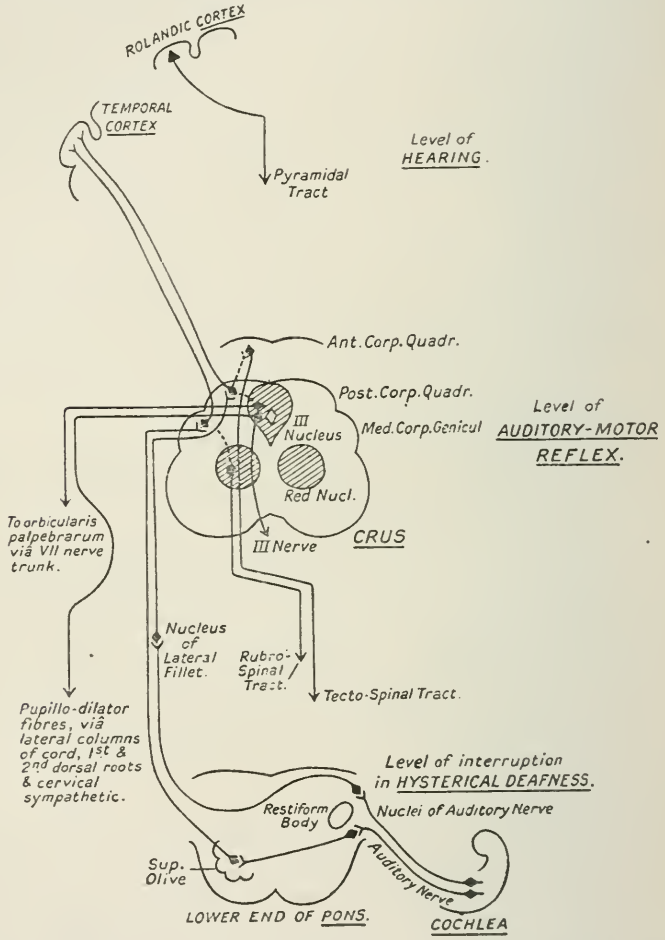


Fig. 16.—Diagram to illustrate the neurones concerned in hysterical deafness and in the auditory-motor reflex. (*From the 'Proceedings of the Royal Society of Medicine,' by kind permission.*)

exaggeration of the defensive reflexes, which is a very characteristic feature of these war neuroses. In severe cases the patient appears to be in extreme terror: he jumps violently and trembles from head to foot at the slightest sound, and raises his arm as if to protect his face.

The possibility of the jump reflex occurring in the absence of actual hearing, and being absent when hearing is not abolished, is of some practical importance, as the presence or absence of the reflex is often used as a test of complete deafness in mute children and in supposed malingerers, whereas its presence is not really a proof that actual hearing occurs.

Hysterical Deafness.—Hurst and Peters[23] state that, in their experience, organic disease or injury of the ear of sufficient intensity to produce severe cochlear deafness is invariably accompanied by loss of vestibular activity. They quote the case of a soldier who was blown up by a shell on August 29, 1916. He became blind, deaf, and dumb, although he did not lose consciousness. The sight returned next day, but the speech did not come back until November, 1916. The deafness remained. Functional examination showed complete loss of air- and bone-conduction. At the first examination the patient's hands twitched and his pupils dilated when a loud noise was suddenly made behind him. This showed that the auditory motor or jump reflex—a function of the mid-brain—was present, though diminished. Functional examination of the vestibular apparatus gave normal nystagmus and giddiness. Electricity, etherization, hypnotism, and auditory re-education all failed to restore the hearing. Later examinations showed that the auditory motor reflex was absent. Even a loud noise made close to the patient's head when asleep failed to waken him. The patient was now told that a small operation would be certain to cure him, and he readily consented. Ether was given, two small incisions were made behind the ear, and stitches were inserted. A loud noise was made during the operation, and at the end the patient jumped off the table. In the next few minutes normal hearing returned in both ears.

Hurst and Peters state that the momentary deafness which is the natural result of the terrific noise caused by the explosion may make such an impression on the mind of a soldier that on coming to himself his first thought is for his hearing, especially if this was already impaired by disease. The patient is so convinced that he is permanently deafened, that he becomes actually deaf as a result of auto-suggestion. Hearing necessitates listening. Inattention during a dull sermon results in total deafness to the sermon. In hysterical deafness the patient is so convinced that he cannot hear that he does not listen. Though the sound vibrations reach the ear, they do not give rise to the slightest auditory sensation. The synapses at one or more cell stations in the auditory path must be unswitched, probably as the result of retraction of the dendrons. Persistence of deafness during hypnosis and deep sleep shows that the unswitching of the synapses is more profound than usual. Even in deep sleep the normal synapses can always be forced by a loud noise. Hurst and Peters hold that hysterical deafness is an exception to Babinski's law that hysterical symptoms, as they are due to suggestion, do not persist during sleep. The writers call attention to the fact that there is no

abnormality in the speech of hysterical deaf cases—i.e., these patients do not have the toneless voice met with in cases of organic deafness.

REFERENCES.—[1]*Laryngoscope*, 1917, July, 543; [2]*Cleveland Med. Jour.* 1917, Jan., 1; [3]*Jour. Laryngol. Rhinol. and Otol.* 1917, April, 125; [4]*Ann. Otol.* etc. 1916, Dec., 994; [5]*Ibid.* 835; [6]*Ibid.* 1917, *March*, 202; [7]*Med. Jour. Austral.* 1917, July 21; [8]*Med. Rec.* 1917, i, 762; [9]*Jour. Laryngol. Otol. and Rhinol.* 1916, Dec., 497; [10]*Ann. Otol.* 1917, March, 140; [11]*Ibid.* 1916, March, 92; [12]*Ibid.* 1; [13]*Internat. Abstr. of Surg.* 1917, July, 1; [14]*Pract.* 1917, i, 245; [15]*N. Y. Med. Jour.* 1917, i, 1138; [16]*Laryngoscope*, 1916, Sept., 1139; [17]*Jour. Laryngol. Otol. and Rhinol.* 1917, April, 117; [18]*Ib'd.* 338; [19]*Paris Méd.* 1916, Jan. 1; [20]*Jour. Laryngol. Otol. and Rhinol.* 1916, Sept., 374; [21]*Proc. Roy. Soc. Med. (Otol. Sect.)* 1917, May; [22]*Ibid.*; [23]*Lancet*, 1917, ii, 517.

ECLAMPSIA. (*See* PREGNANCY.)

ECTOPIC GESTATION. *W. E. Fothergill, M.D.*

Ladinski[1] states that hæmorrhage from a ruptured tube must be regarded in the same light as hæmorrhage from any other source, and should be checked as quickly as possible, regardless of the severity of the shock. "On several occasions," he says, "I have operated when the patient was unconscious and required no anæsthesia, either general or local. It is my firm belief, justified by the results obtained in the cases of extreme collapse, that, if the operation is performed with ordinary skill and rapidity, the additional shock will be so slight that it cannot possibly be held responsible for a single death, especially if infusion or transfusion be resorted to as soon as the abdomen is opened.

"Cases of tubal abortion and rupture present such a multitudinous variety in their course and termination that it is absolutely impossible to say from the signs and symptoms in a given case whether the hæmorrhage will cease, or continue and become more profuse. Moreover, I have noted that the presence of blood in the peritoneal cavity was an important element in the vasomotor paralysis and shock. The longer the patient was allowed to bleed from rupture or abortion, the greater the depression and the more profound was the shock; and this was regardless of the amount of blood lost. Also, the recuperative power of the patient after the operation depended more on the duration of the hæmorrhage and shock than on their intensity at the time of operation. Furthermore, the tendency to secondary shock becomes more marked as the interval between rupture and operation is prolonged. Every patient in profound shock, operated on by me, recovered, and no patient was refused the benefit of operation as long as there was a cardiac beat.

"I cannot subscribe to the doctrine of deferring operation and trusting to chance, the inevitable result of which is rapidly to diminish the margin of reserve strength of the patient. Nor can I see the wisdom of the rule of watching the patient with the view of postponing operation when she is improving, and operating if she grows worse. If the patient's condition improves without operation, there can be no question that she would be better off because of the operation; and to wait until the patient grows worse entails an

unnecessary loss of very precious moments, that may mean the possible sacrifice of life. Shock is assuredly no contra-indication to the immediate operation for ruptured tubal pregnancy."

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 633.

ECZEMA. *E. Graham Little, M.D., F.R.C.P.*

Heimann,[1] on histological grounds especially, but also on clinical considerations, regards 'eczema' and 'dermatitis due to external irritants' as essentially the same processes, and advocates the relinquishment of the term eczema, retaining dermatitis to cover both types of disease. In acute phases of the disease the vesiculation is initiated by an intracellular œdema, the cells becoming enlarged and rounded, with the nucleus pushed to one side, and thus producing the appearance described by Leloir as *altération cavitaire*, characteristic of eczema. In the chronic phase the fluid is intercellular, surrounding the cells and distending the prickles to breaking-point. This phenomenon, which is known as *spongiosis*, from its resemblance to the section of a saturated sponge, is very characteristic of so-called eczema. *Parakeratosis*, shown by the persistence of nuclei in the stratum corneum, and affording evidence of deficient keratization, and *acanthosis*, or proliferation of the rete cells, complete the histological picture, which is identical for eczema and dermatitis. Eczema, which the author wishes to eliminate as a term, but which he nevertheless persists in using, may be due to external or internal causes, and to the activity of outside agents in predisposed individuals, in which external and internal causes co-operate. The latter causation has received much attention in the general study of anaphylaxis, and accounts probably for many examples of the disease. (See White's conclusions quoted below.)

The author quotes with approval the classification of internal causes offered by Besnier, as follows: (1) *Predisposing*: heredity, syphilitic and alcoholic ancestors, ancestors who suffered with other skin diseases, constitutional weakness, diabetes, lithiasis, bronchitis, etc.; (2) *Physiological*: dentition, pregnancy, and lactation; (3) *Nervous*; (4) *Functional*: digestive, assimilatory, and excretory disturbances; (5) *Local predisposing*: ichthyosis, keratosis pilaris, seborrhœa, skin folds, and body orifices. Of these, probably errors of metabolism are the most important.

Of external causes, local irritants of mechanical, chemical, or thermic nature, and micro-organisms, are the two chief groups. But even when a local causation is apparent, it must be remembered that the predisposition of the patient is an essential factor from which one can never get away, and this consideration should influence treatment, as experience shows that treatment confined to external medication is a much more protracted business than when internal measures are combined with local. Of these measures, colon irrigation, enemas, purgatives, and sedatives are the most important.

Knowles[2] supports Heimann's identification of eczema and dermatitis, but insists more upon the external factors.

C. J. White,[3] pursuing his interesting observations on food allergy, mentioned in the MEDICAL ANNUAL of last year, p. 187, gives further details of his methods. An exceedingly superficial incision was made with a clean, sharp scalpel. The flexor surface of the arm of the affected individual was cleaned, two parallel rows of four or more incisions were made, and on four of the incisions were placed a drop of cow's fat-free milk, a drop of oatmeal-water or of lactose, a small piece of salt-free butter, and a drop of egg-albumen. (At times more detailed tests of many substances were made.) The other incisions or abrasions were untouched and left as controls. A positive reaction consists in the reddening and infiltration and, in rarer instances, the papulation of the skin. If the control incision manifests the same reaction, the test is not considered positive.

Tested in this manner, after one examination, 61 cases of eczema proved negative; 19 cases reacted positively to all the food types inoculated: 26 others were positive to one or more of the foods tested. The author suggests that, with fuller knowledge, the negative result in so large a proportion of cases may be explained by the fact that the patient may be allergic at one time and not at another, and one examination is plainly insufficient to denote negativity.

Examination of the fæces in 13 eczematous patients showed normal stools in 28 per cent of the cases; in 63 per cent there was excess of fat or soaps, and in 8 per cent a surplus of starch. Therapeutic results of withholding the incriminated item of diet did not always confirm the inference that that item was concerned in the causation.

Unna[4] recommends, as an exfoliating and softening agent of the callous portions of the hands in eczema, the application of rubber plaster impregnated with **Ichthargan.** He points out that baths, which are very valuable means to the same end, should be of brief duration, and the temperature should not exceed 30° C. For drying after the bath a fine talc powder is advised. If itching is severe, equal parts of each of the following solutions mixed together should be added to the bath: (1) Tannic acid, 10; distilled water to 100. (2) Sulphate of iron, 20; distilled water to 100.

Eczema Seborrhoicum.—Trimble[5] describes a follicular type of this disease which is less common than the usual figurate type, but may precede and pass into this. Typical lesions of this variety, as seen on the chest or back, are patches that range in size from a silver dime to a half-dollar; they are brownish-red in colour, about the same as the usual lesion of seborrhœic eczema, and are made up of a great number of inflammatory follicles, situated very close together, but always discrete. These follicles are slightly pink and enlarged, with dilated mouths: in each opening, and around it, is seen a piling up of small, greasy scales, making a tiny cone; in fact each individual follicle is a miniature lesion of seborrhœic eczema. The grouping of a large number of such minute lesions makes up a patch of the so-called follicular type. This eruption may become diffuse and spread over a great portion of the body, generally, however, restricted to the

upper half, but the follicular arrangement is always visible. In old-standing cases the skin may assume the likeness of a nutmeg-grater, and diagnosis from lichen planus acuminatus may be difficult. On the assumption that the bacilli of acne and of seborrhœa are identical, the author gave an acne stock **Vaccine,** 3 to 5 million every week, combining this treatment with 'external' remedies which are not further specified. Two cases thus treated were cured in from two to three months.

References.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 75; [2]*Ibid.* 79; [3]*Ibid.* 81; [4]*N. Y. Med. Jour.* 1916, ii, 325; [5]*Jour. Cutan. Dis.* 1917, Jan., 11.

ELEPHANTIASIS NOSTRAS. *E. Graham Little, M.D., F.R.C.P.*

Elliott[1] reviews the literature and reports a new case of this somewhat rare disease. The case is of importance and interest, as the initial sepsis followed upon vaccination, in a girl, age 19, in whom at the site of vaccination a large ulcer developed, which took three months to heal. Eleven years later, without fresh local injury, the arm began to swell, and when seen by the writer there was a diffuse enlargement of the arm from about six inches below the acromial process to the distal ends of the first phalanges, at which level the swelling stopped abruptly, so that the fingers remained unaltered. Considerable pain was felt in the fingers, elbow, and shoulder. There were repeated attacks of erythema in the swollen part, the erythema subsiding but the swelling increasing in volume with each attack. Over the swollen part the skin was greatly thickened, but there was no adhesion to the underlying tissue, except on the fingers, which felt 'sclerodermatous.' The whole arm was of a dusky-red colour, with depigmented areas, giving it a mottled aspect. There were numerous wart-like lesions on the back and palm of the affected hand, but when incised these lesions emitted a small amount of lymph. Careful histological investigations were made of the affected part, including some of the wart-like lesions and the erythematous skin in one of the intercurrent attacks. In the latter examination numerous cocci were identified in the sections, but cultures taken when the erythema had disappeared proved sterile. The author claims to have excluded leprosy and sclerodermia, and reports a negative Wassermann. A review of the literature shows a large preponderance of cases due to the streptococcus of Fehleisen, which was also the apparent causative agent in a considerable proportion of tropical elephantiasis, although they are usually ascribed after Manson to filariasis.

The treatment instituted in this case was baking the hand and arm in an arthritis oven, for thirty minutes daily, followed by vigorous **Massage with Petrolatum.** The patient was given weekly intramuscular injections of **Antistreptococcus Serum.** Under this treatment the erythema disappeared, and the arm and hand had reduced about one-third in size when the patient left the hospital.

Reference.—[1]*Jour. Cutan. Dis.* 1917, Jan., 17.

ENDARTERITIS OBLITERANS. (*See* THROMBO-ANGIITIS OBLITERANS.)

ENURESIS IN CHILDREN. *Frederick Langmead, M.D., F.R.C.P.*

ETIOLOGY.—H. Apfel[1] points out the need for taking a most careful history and a scrutiny of the child's habits. Apart from tea, coffee, or water late at night, inquiry may elicit that the heaviest meal is in the evening, which causes it to carry to bed a loaded intestine and conduces to a desire to empty the bladder during the next two or three hours when the child is sound asleep. Among factors which may cause enuresis, he mentions constipation, anæmia, thread-worms, neuroses, epilepsy, lesions of the central nervous system, adherent clitoris or long prepuce, vesical calculus, cystitis, and excess of urates or oxalates in the urine.

TREATMENT.—Apfel groups the management of such cases under the following heads: (1) Instructions to the mother: (2) A diet list; (3) Connection of existing pathological conditions: (4) Endeavour to obtain the child's co-operation; (5) Drugs. The mother should be instructed as to the proper hours for the child's meals, bath, exercise, and bed, and the need for proper ventilation in the bedroom. The bed should not be too comfortable, and the bowels should be kept open. The **Diet** list should be a detailed one, and should not contain spicy food, tea, or coffee. No liquids should be allowed after 5 p.m., except when the child is very thirsty, when only teaspoonfuls should be given. If the urine is very acid, allow no strongly acid fruits; limit pastry and red meats. Amongst the pathological conditions to be corrected if possible, he mentions large tonsils and adenoids. He lays considerable emphasis on training the child's power of control over the bladder sphincter by causing it to stop micturating, and then start again by word of command, at first in the doctor's presence, relegating this training afterwards to the mother. The child may be encouraged by keeping its own record on a sheet of paper of wet or dry beds. In older children, when the case is obstinate, passing a cold sound may help when other methods fail. Drugs he considers of minor importance. **Atropine Sulphate** still holds first place if used in an aqueous solution of $\frac{1}{2}$ gr. to the ounce, given at first in 1-min. doses t.d.s. for two days, and then increased to 2 or 3 min., watching for dilated pupils or flushed cheeks. For anæmic children he recommends **Iron,** especially the albuminate; for acid urine, **Potassium Citrate;** for coliuria, **Hexamine.** For neurotic children he advises large doses of **Bromide,** especially if petit mal be present. Thyroid extract he has found of little use except in cases of hypothyroidism. The treatment outlined requires much care and perseverance, and should be continued for some time after apparent cure.

L. N. Redway[2] quotes Stewart, who has located higher centres of micturition in the corpus striatum, optic thalamus, and motor cortex. Hyperexcitability of these may cause precipitancy of the bladder—contraction and relaxation of the compressor urethræ muscle. In

view of this work. Redway holds that atropine benefits enuresis by its mydriatic and cycloplegic action, thus abolishing the eye-strain which is the cause.

A. Newlin[3] says that the simple procedure of anticipating the involuntary act by voluntarily emptying the bladder, when carried out systematically can preclude the use of drugs. The child's attendant is first made to understand that constant vigilance is necessary, and she must devote herself entirely to the child for the first three or four days and nights. It is rarely required longer. The nurse is given a sheet of paper with the hours of the day and night placed in a vertical row at the left-hand margin under the heading of the day of the week. If the enuresis occurs on an average every two hours, she is instructed to put the child on the chamber every hour for the first twelve hours. If she finds the clothing wet at any such time, the hour is noted on the chart. At night the same frequency is maintained up to 11 p.m. or midnight ; after that every second hour is all that is necessary. At the end of the first twenty-four hours she is guided by the chart, and may extend the interval between the voluntary micturitions, always, however, anticipating the hours marked wet on the day before by at least half an hour. Thus on each succeeding day the intervals are longer, but if enuresis occurs, they are shortened about the hours on which it was noted. In his experience of this method enuresis usually ceases entirely, and by the end of the first week in the milder cases the child will go from 11 p.m. to 6 a.m. without wetting the bed.

References.—[1]*N. Y. Med. Jour.* 1916, ii, 466; [2]*Amer. Med.* 1917, Jan. (abstr. *Med. Press and Circ.* 1917, Mar., 241) ; [3]*Clin. Jour.* 1916, Sept., 331.

EPIDERMOLYSIS BULLOSA. *E. Graham Little, M.D., F.R.C.P.*

Ravogli[1] reports a case and contributes a dissertation on this rare disease, which may be best described, in Colcott Fox's phrase, as 'a congenital vulnerability of the skin.' The first indication of abnormality was noted when the patient was only nine days old, and this vulnerability was so extreme that every little injury would be succeeded by the appearance of a bulla, sometimes within half an hour of its occurrence ; some itching preceded the development of the bulla. The lesion would generally heal within five or six days, leaving a pigmented scaly patch. The nails were all shed within the first twelve months of life. The health of the patient was not otherwise much interfered with. He was eleven years old when Ravogli saw him. There was no history of family transmission. The author regards hereditary syphilis as a probable factor, and treated this patient with small doses of **Calomel** and an iron tonic, and subsequently with intramuscular injections of **Neosalvarsan**, 3 grms. every week. It is claimed that "from the first injection the bullæ began to diminish in number and size, and the boy had greatly improved in general nutrition and the condition of the skin." [The coloured plate herewith illustrates a very remarkable case of epidermolysis

bullosa, acquired late in life, when the patient was about forty years old; his son also developed the disease when about eighteen years old. The picture (*Plate XI*) is taken from the father; the case was reported by me in the *Proceedings of the Royal Society of Medicine*. vol. x, No. 2, Dec., 1916.—E. G. L.]

Reference.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 256.

EPILEPSY. *J. Ramsay Hunt, M.D.*

Is Epilepsy a Bacterial Infection?—In recent years there has occurred in the United States a small epidemic of infectious theories of epilepsy, with demonstrations of the supposed offending organism in the blood of epileptics, the most notorious of these being the so-called *Bacillus epilepticus* of Reed (*see* Medical Annual, 1917, p. 194). J. F. Munson,[1] pathologist to the Craig Colony for Epileptics, discusses this question under the above title. He first emphasizes the fact that during more than twenty years over 4250 epileptics have been under observation at the Craig Colony; during the same period hundreds of employees, nurses, and doctors have been in daily contact with the patients; surgical operations and autopsies have been done, both numbered in the hundreds; and in all this material during all these years not one fact has come to notice which would suggest that epilepsy was an infectious disease.

Tobacco Epilepsy.—Experimental researches on animals have shown that the ingestion of tobacco may induce a tendency to convulsive seizures, and cellular changes in the cortex of rabbits and guinea-pigs submitted to slow tobacco intoxication have been reported by a number of observers. One finds also, scattered through medical literature, accounts of cases in which excesses in tobacco have apparently induced epileptic manifestations, which ceased with the discontinuance of the habit. The occurrence of epilepsy has also been noted among the workers in tobacco factories, with a probable etiological relationship; so that in the management of cases and the regulation of the lives of epileptics the possible deleterious relationship of nicotine should always be borne in mind.

Tedeschi[2] has recently reported three cases in which nicotine seemed to be the essential causative factor.

Bromide Sedation in Epilepsy.—This question is reviewed by William T. Shanahan.[3] For a considerable time after the use of **Bromides** was initiated, the exact method of its operation in controlling seizures was not well understood. Subsequent experiments, carefully made, demonstrated that a sedative action on the cortical cells was effected by bromides given in sufficient dosage to insure physiological action. While, perhaps, a bromide repeated in reasonable doses, given under careful restrictions, may in the ordinary person cause no deleterious result, it has been too commonly the experience of physicians that bromides administered over a considerable period have in some patients caused permanent damage, or so reduced the general health of the individual under treatment that one might

PLATE XI.

EPIDERMOLYSIS BULLOSA

MEDICAL ANNUAL, 1918

E. Graham Little

well feel convinced that the remedy was worse than the disorder. It is a matter of record, however, that bromine, or some of its salts, when properly given, with due attention to combating the evil effects of the drug, bring about material improvement in carefully selected epileptics, and in some an apparent arrest of the symptoms of the disorder.

It is very commonly observed that the removal or alleviation of abnormal conditions existing in epileptics may so improve the general health of the particular patient that the symptoms of his epilepsy are relieved, at least in part, without the administration of depressants to the cortical substance. Unless the bromide is given in the form of **Sabromin, Sedobrol,** or some other of the more elegant preparations, great care must be exercised to give it in solution, following meals, and well diluted. While the ordinary epileptic is prone to suffer from constipation, the one under bromide medication has a special tendency toward this symptom: therefore **Laxatives, Colonic Flushings,** etc., must be freely resorted to. In order to maintain a proper functioning of the skin in the epileptic under bromide medication, more frequent bathing than is ordinarily the case is essential.

Sedatives such as bromides too often only mask the symptoms in epilepsy, tending to arouse false hopes as to complete recovery, thus often leaving out of action the basic readjustment of living conditions necessary to demand of an epileptic, whose active co-operation in carrying out lines of treatment is absolutely essential for improvement.

At the Craig Colony for Epileptics, during several years past there has been a marked reduction in the quantity of bromides used in the treatment of its patients, as is shown in the accompanying table:—

Bromide Sedation at the Craig Colony for Epileptics.

Year	Population of Colony	Dosage in ounces of bromides and other bromine-containing compounds per patient yearly	Average number of seizures per patient
1902 ..	762	10·8	98
1903 ..	824	12·5	124
1904 ..	836	15·6	124
1905 ..	992	10·8	146
1906 ..	1046	12·2	136
1907 ..	1054	5·7	128
1908 ..	1160	8·8	127
1909 ..	1273	3·0	113
1910 ..	1330	0·28	110
1911 ..	1381	1·7	106
1912 ..	1433	0·1	115
1913 ..	1434	0·4	104
1914 ..	1428	0·87	105
1915 ..	1450	0·45	95

The patients under treatment were epileptics of all ages, from infancy to the advanced senile period, the majority being young adults. The duration of epilepsy in those under treatment varied from a few months to a great number of years, the majority being several years. It is of interest to note that with the lessened administration of various preparations of bromine there has been no increase in the average number of seizures per patient, but on the other hand there has been on the whole a slight lessening in the number, the conclusion being that the general readjustment of every possible phase of the epileptic's life is of more importance than the indiscriminate use of sedation.

References.—[1]*N. Y. Med. Jour.* 1917, 836; [2]*Riforma Med. Naples*, Feb. 17, xxxiii, No. 7, 169 (abstr. *Jour. Amer. Med. Assoc.* 1917, i, 1352; [3]*Ther. Gaz.* 1916, 764.

EPITHELIOMA. *E. Graham Little, M.D., F.R.C.P.*

Sweitzer[1] groups under the general title 'skin cancer' 43 cases, the large majority of which were clinically rodent ulcer, though this name is nowhere used in his paper. Four cases in which the lower lips were affected were probably not of rodent type. In 7 instances the lesions were multiple, in 6 of the 7 developing on seborrhœic keratoses. The incidence of sex—28 males and 15 females—is interesting, showing a preponderance in males somewhat unusually excessive. Seborrhœic keratoses were present in 30 per cent of the cases, direct injury in 25 per cent. The author draws attention to the desirability of giving early treatment to the precancerous dermatoses, which are usually avoidable or curable disorders. All the patients were treated with **Radium**, and the author claims 'cures' in 34 out of 43 cases.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1917 ii, 179.

ERYSIPELAS. *E. Graham Little, M.D., F.R.C.P.*

Keppler[1] recommends painting over the affected surface with 10 per cent solution of **Iodine.** This application is also preventive of erysipelas developing in a wound, the skin round which should be painted with this solution every time it is dressed.

Intramuscular injections of **Milk** advised (p. 20).

Reference.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 812 (abstr.).

EXOPHTHALMIC GOITRE. (*See* Goitre, Exophthalmic.)

EYE AFFECTIONS, GENERAL THERAPEUTICS. (*See also* Retina, Diseases of.) *A. Hugh Thompson, M.D.*

At the 1916 Congress of the Ophthalmological Society,[1] Finzi reported the successful treatment of a recurrent *endothelioma of the orbit* by **Radium**, and Captain Pinch, of the Radium Institute, reported several successful cases. One, of epithelioma of the eyelid, was sent to him by the late Mr. Jessop; another was a case of epithelioma of the cornea itself sent by Mr. Treacher Collins. The dose has to be

carefully regulated according to the nature of the case. An underdose may cause excessive stimulation, while an overdose may cause too severe a reaction. In Pinch's experience it is better to treat *epitheliomata* and *rodent ulcers* by one massive dose. When the radium treatment of rodent ulcer was started it was almost invariably carried out by several short exposures of ten minutes' duration, the number varying from eight or twelve up to twenty or thirty exposures. His treatment for rodent ulcer is two and a half hours' exposure with an unscreened applicator. The large dose produces a destructive reaction—not stimulation of the malignant cells.

Radium is also being employed for the treatment of *spring catarrh* and of *trachoma* (cf. MEDICAL ANNUAL, 1913, p. 184, and 1914, p. 233).

Bordley,[2] of Baltimore, cites cases in which *cyclitis* with vitreous opacities, and 'K. P.' with or without secondary glaucoma, yielded to **Thyroid** treatment (iodothyrin, $2\frac{1}{2}$ gr. once a day, increased to three times a day). His theory is that the thyroid plays an important part in the body's fight against infection or the results of infection. In *malignant uveites* we have to do with an infection, and it may not be sufficient to attack it at its source, even if that can be discovered. We may have to reinforce the protective mechanism as well.

Standish[3] reports three cases, and gives references to eight others, where the administration of thyroid, either in medicinal form or under the guise of some one or other of the widely advertised anti-fat nostrums, appears to have caused retrobulbar neuritis and central scotoma. The late Wendel Reber,[4] who advocates the administration of thyroid in some forms of *parenchymatous keratitis* that do not yield to antisyphilitic treatment and are not of tuberculous origin, issues a caution against too large doses. As a beginning, he says, $\frac{1}{5}$ to $\frac{1}{2}$ gr. of thyroid substance is a quite sufficient dose.

In the address already quoted, Reber speaks highly of the help which can be rendered in the treatment of various eye diseases by the administration of daily hypodermic doses of **Pilocarpine**, beginning with $\frac{1}{20}$ gr. and increasing to $\frac{1}{4}$ gr., so as to produce a daily sweat. With the help of this treatment appropriate drugs can be administered in ascending doses on a far larger scale than without it. Examples of favourable results include a case of commencing *central choroiditis* in a woman of thirty-five, the second eye having been already blinded from the same disease, and no cause having been discovered. With daily sweats, **Salicylates** were given freely, and **Strychnia** in ascending doses hypodermically up to $\frac{1}{8}$ gr. Vision improved from $\frac{2}{60}$ to $\frac{6}{15}$ in three weeks, and eight years later was $\frac{6}{12}$, the choroidal lesion presenting the picture known as 'hole in the macula.'

In another ophthalmoscopically similar case in which the cause was syphilis and the lesion equal in the two eyes, with the help of daily sweats the dose of **Biniodide of Mercury** was increased in the course of three weeks up to $\frac{1}{2}$ gr. three times a day, and the vision

improved in each eye from $\frac{6}{6}\frac{6}{0}$ to $\frac{6}{9}$. Still more remarkable was a case of typical *retinitis pigmentosa* in a man of forty-five, who was placed on **Pilocarpine** diaphoresis and ascending doses of **Strychnia,** and whose vision was improved in four weeks from $\frac{6}{6}\frac{6}{0}$ to $\frac{6}{1^2}$, the improvement lasting for five years.

The value of diaphoresis in the treatment of eye diseases has long been known (cf. MEDICAL ANNUAL, 1910, p. 301, where the method of employing **Guaiacol** as an alternative to pilocarpine injections is described.)

Hypopyon Keratitis.—The multiplicity of remedies advocated for this condition is an indication that none is completely satisfactory. This was was discussed at the American Medical Association in 1916. According to Verhoeff,[5] the following are of small service: serum and vaccine therapy, optochin (cf. MEDICAL ANNUAL for 1916, p. 237), protargol and argyrol, methyl-violet and methyl-blue; zinc sulphate is only effective in ulcers caused by the diplobacillus. On the other hand, the following methods are really effective:—

1. **Cauterization** with pure carbolic acid, if the case is not too far advanced.

2. The **Actual Cautery** in the more severe cases, but this has the disadvantage of leaving permanent scars.

3. **Corneal Section.** There is no question as to the effectiveness of this method, the explanation probably being that it reduces the pressure on the cornea, allowing drainage to take place from the cut surfaces, and at the same time causes the ulcer to be continually irrigated by fluid from the anterior chamber, this fluid, owing to the inflammatory reaction, being rich in the bactericidal properties of the blood. The disadvantage of this method is that it is almost invariably followed by an anterior synechia, with its attendant dangers of secondary glaucoma and uveitis.

4. In applying any germicidal solution to the ulcer it is desirable to lay the whole of it bare by curetting, drying, and, if necessary, incising its edges or base before applying the solution. Verhoeff describes in detail his method of doing this, the special solution recommended by him consisting of **Iodine** 25, **Potassium Iodide** 50, water 100. By preparing the ulcer and drying it, this can be allowed to remain as a pool for five minutes at a time.

5. A method mentioned by Starr,[6] which is extremely useful as an auxiliary in the treatment of these ulcers when severe, is to perform a **Peritomy** and cover over the entire cornea with conjunctiva, tying it with a purse-string suture and allowing it to remain for five or six days, when the suture generally gives way.

6. **Subconjunctival Injections** continue to be practised with good results. Some think **Salt Solution** as effective an injection as anything. Melville Black,[7] following Darier, advocates **Cyanide of Mercury** of a strength from 1–1500 to 1–2500. To overcome the pain following the injection, Darier uses 1 per cent **Acoin,** Black $\frac{1}{3}$ gr. of **Novococain.**

7. Shahan, of St. Louis,[8] has investigated, both pathologically and clinically, the treatment by **Heat** without cauterization. From experiments on rabbits he came to the conclusion that a temperature of 152° applied for one minute was sufficient to arrest the ulcerative process due to the artificial inoculation of pneumococci. A more moderate application of heat is insufficient, and one that is much more excessive involves the risk of perforating the cornea. Shahan has therefore constructed a simplified instrument, by means of which the requisite heat can be applied, and reports very successful results from its use. The parts are shown in *Fig.* 16. On the left are four bullet-shaped objects—the applicators. Each is hollowed out to receive the bulb of the thermometer. In the centre is shown the 'core,' with an applicator and thermometer in position. This core is a heavy piece of brass tubing 4 in. (about 10 cm.) long and $\frac{9}{16}$ in. in outside diameter. One end has a lock-nut in it for holding the thermometer fast, while the other is reamed out to snugly receive the applicators. The figure on the right is an insulating jacket for retaining the heat: it consists of a metal case $1\frac{1}{4}$ in. in diameter, and about 4 in. long, heavily lined with felt, open at each end and hollow through the centre to receive the core.

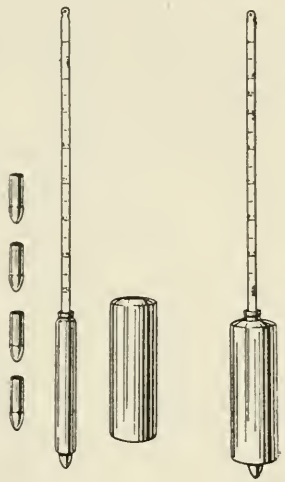


Fig. 17.—(*a*) Thermophor parts: applicators, core with applicator and thermometer in position, and felt-lined insulating case. (*b*) Assembled thermophor, ready for use.

When it is desired to use the instrument, a properly shaped applicator is selected and slipped into the end of the core. The thermometer is then slid through the lock-nut and core until its bulb is in the applicator as far as it will go. The thermometer is then fastened in place by a few turns of the lock-nut. Then, with the thermometer used as a stem, the core is held over a flame, as that of a Bunsen burner, until the mercury in the thermometer reaches about 170°. The core is then slipped into the insulating jacket, where it will be held by the friction of the felt. The mercury in the thermometer is then observed until it falls to 156°. At this instant the tip of the applicator is placed in contact with the ulcer and held there for one minute. During this time the mercury will fall from 5° to 10°, according to the size of the tip of the applicator.

Injections of **Milk** advised in some affections of the eye (p. 20).

REFERENCES.—[1]*Trans. Ophth. Soc.* 1916, 246; [2]*Jour. Amer. Med. Assoc.* 1916, ii, 412; [3]*Trans. Amer. Ophth. Soc.* 1916, vol. xiv, pt. ii, 608 (Abstr. *Ophthalmoscope*, 1916, 656; [4]*Brit. Jour. Ophth.* 1917, May, 294; [5]*Jour. Amer. Med. Assoc.* 1917, ii, 1964; [6]*Ibid.* i, 1974; [7]*Ibid.* ii, 1974; [8]*Ibid.* 1969.

EYE, INJURIES TO. *A. Hugh Thompson, M.D.*

Concussion Injuries to the Globe.—This subject was summarized in last year's MEDICAL ANNUAL, p. 204. Further light was thrown on it at the discussion at the 1917 meeting of the Ophthalmological Society. These injuries are the result of vibrations, which are classified by Ormond[1] thus: (1) Those from projectiles traversing the orbits, the 'through-and-through' wounds; (2) Those from direct blows on the bones of the orbit; (3) Those from direct blows on the eye itself; and (4) Vibrations, the result of air-pressure or 'windage.' This last category is perhaps not so common as would appear from some reports. As was pointed out by Cruise,[2] the evidence of the wounded men themselves as to how their injuries were caused is often fallacious, and in cases which are attributed to the close neighbourhood of a bursting shell it is often found that minute particles have inflicted a direct injury on the eye.

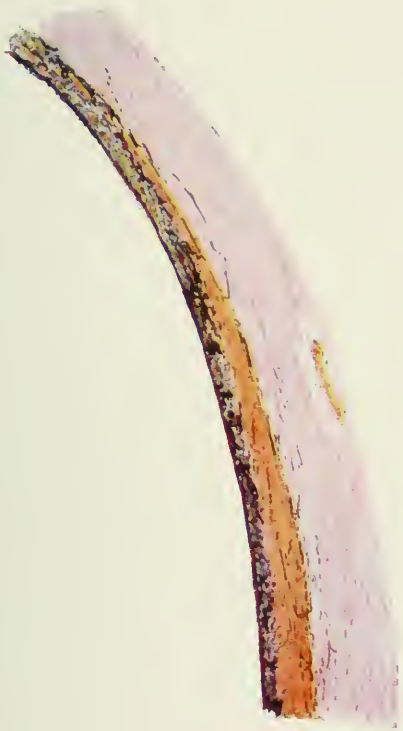
An important new fact was proved by Treacher Collins[3] at the same meeting—that *subchoroidal hæmorrhage* may occur in an intact eyeball as the result of concussion. The blood effused tends to accumulate as a flattened layer between sclera and choroid, and the latter is compressed. The consequent emptying of the choroidal vessels over the hæmorrhage gives rise to certain ophthalmoscopic appearances, viz., a white haze in the retina, followed by pigmentation and choroidal atrophy. These appearances, Collins suggests, in slight cases which clear up, are identical with those first described by Berlin, in 1873, under the name 'commotio retinæ,' or with the frequently observed macular pigmentation following injuries, the result of which is permanent. The reason why the macular region is peculiarly liable to be affected is that here the capillary plexus of the choroid is finest, so that arrest of the choroidal circulation would be more easily brought about here than elsewhere. On the other hand, the retina at the macula, being entirely dependent on the choroidal vessels for its nutrition, would necessarily degenerate if this supply were cut off. (*See Plate XII.*)

Concussion Changes in the Crystalline Lens.—In a preliminary note, Whiting[4] gives a number of instances where partial, and in some cases merely transient, opacities of the lens followed shell wounds in which the eye itself was not directly wounded, but presumably injured by concussion. Some of the cases were posterior cortical opacities, generally stellate in form. Others were anterior cortical or subcapsular, composed of fine dots in the centre of the anterior part of the lens, taking a form either annular, discoid, stellate, or irregular. Changes occurred in these while under observation, the opacities becoming in some cases more and in others less dense or disappearing altogether.

Hæmorrhage into the Sheath of the Optic Nerve.—This has for long been supposed to be one of the causes of obstruction of the central artery of the retina causing monocular blindness,[5] but until now no anatomical argument supporting the suggestion has been forthcoming.

PLATE XII.

SUBCHOROIDAL HÆMORRHAGE



Dr. Treacher Collins.
From the Ophthalmological Society's Transactions. By kind permission

PLATE XIII.

MONOCULAR BLINDNESS FROM SKULL INJURY

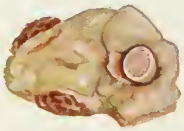


Fig. A.

Fig. B.

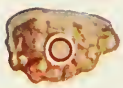


Fig. C.

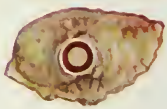


Fig. D.

Fig. A shows a nerve without hæmorrhage, taken from a case of fracture of the skull; its diameter measures 3 mm. *Fig. B* shows the right optic nerve from one of Hogarth Pringle's cases; a large intravaginal hæmorrhage surrounds the nerve, which in this case only measures 2 mm. across. *Figs. C* and *D* illustrate the appearances presented by the two optic nerves of a patient brought to Pringle's ward, believed to have a fracture of the skull, but who was really suffering from purpura hæmorrhagica. There was no fracture of the skull, and a large subdural clot was found post mortem, while both optic nerves exhibited these pronounced intravaginal hæmorrhages, that in the left sheath (*Fig. D*) being considerably larger than that in the right (*Fig. C*), and causing a correspondingly greater compression of the nerve.

By kind permission of the 'British Journal of Surgery.'

This is now supplied by Pringle,[6] of Glasgow. He approaches the subject from the point of view of the general surgeon, and he bases his views mainly on the results of 136 post-mortem examinations, in which a fracture of the skull was proved to be present—injuries received not during the war but in civil life. Among these cases fracture of the optic foramen was uncommon, and in none was there evidence of direct injury to the optic nerve. On the other hand, hæmorrhage into the sheath of the optic nerve was found to be present in 12 cases. In 3 of these it was certain that the blood had been effused into the sheath on the orbital side of the foramen, i.e., it had not spread into it (as in the majority of cases) from the cranial cavity, and in one of these 3 cases there was no fracture of either of the orbital roofs or either of the optic foramina. This case, the author says, is proof that hæmorrhage into the sheath may occur from rupture of the vessels of the nerve or its sheath as the result of the varying tensions produced in the tissues of the orbit by violence. This being so, the inference is drawn that an intravaginal hæmorrhage may result from violence applied to the head without a fracture being produced in any region of the skull whatever. The author believes that many recorded cases of monocular blindness arising after slight injury to the head in which no loss of consciousness followed the trauma have been of this nature. If so, it follows that there is a possibility that the vision would be improved to some extent, if not completely restored, provided the blood could be evacuated at an early stage. The suggestion is, that every case of monocular blindness which may reasonably be supposed to be due to this cause, should be given the chance of having the optic nerve exposed by a Krönlein operation, so that, if blood is found, it may be evacuated. Figures are given (*see Plate XIII*), drawn from actual specimens, to show that a high degree of compression of the nerve can be caused by blood effused into its sheath. Blindness may be caused either by direct pressure on the nerve or by interference with its blood-supply. If the vision is to be saved by operative interference it must be carried out at the earliest possible moment. The suggestion is well worthy of the consideration of military surgeons at base hospitals.

Visual Concussion of Central Origin.—Kinnear Wilson,[7] discussing this difficult subject, opines that such cases must be rare. Among cases where vision is affected by violence without any structural changes either in the eyes or visual paths or cortex, he distinguishes three categories: (1) Cases of subconscious malingering, which can be caught out by known tests. (2) Cases of traumatic hysteria, the affection of vision coming on after an interval from the receipt of the wound ("There is no hysteria in the firing line"), and being generally associated with other hysterical manifestations. Concentric diminution of the visual fields may occur, but not as an isolated symptom. (3) Certain cases of organic injury of the central visual mechanism by pure concussion, the result of a blow, producing symptoms simulating

hysteria, but not actually hysterical. These symptoms are concentric contraction of the visual fields and also the occurrence of helicoid or spiral fields with certain tests. These symptoms have been supposed to be pathognomonie of hysteria, but cases quoted by Wilson throw great doubt on this. Lister and Holmes's case of telescopic vision illustrated in last year's MEDICAL ANNUAL, p. 209, is quoted as possibly belonging to the category of concussion, which was not the explanation suggested by the authors themselves. In Wilson's own case the man was struck on the back of the head by a piece of shell, making him unconscious for three minutes. When he came to he found himself completely blind, but after forty or forty-eight hours improvement began and continued slowly for months, the fields showing concentric contraction with the spiral curves of fatigue.

Dissociation of Visual Perceptions due to Occipital Injuries.—Another series of interesting observations relating to wounds of the occipital region has been made by Riddoch.[8] He found that patients showing restricted fields from occipital wounds, who could see nothing in the blind part of the field when the test object was kept stationary, were frequently conscious of something moving when the object was oscillated. He therefore took the usual fields of these patients both for the moving and the stationary object, and in some cases the result was very remarkable. In one, for instance, the fields for the stationary object were typically hemianopic, while for the moving one there was no limitation of field. In others with hemianopic fields, moving objects gave rise to sensations in part only of the blind fields. He concludes that movement should be given a place among the stimuli which are recognized as originating visual perceptions, and that in cases of restricted field that recover, the fields for movement, charted at intervals, give the earliest indications of recovering vision. He further concludes that "the presence of dissociation between the fields for appreciation of movement and recognition of an object, afford a valuable aid in prognosis. In cases in which movement is perceived in the affected field, there will be some return of vision; on the other hand, where no movement is perceived after an interval of some months has elapsed, the affected field will probably be permanently blind. Recovery for the appreciation of movement begins at the periphery of the field and extends inward towards central vision."

He further finds that the evidence afforded by his cases supports the contentions of Lister and Holmes on cortical representation of the retina (*see* MEDICAL ANNUAL, 1917, p. 210), which he thus summarizes: (1) Macular vision has its centre in the posterior part of the visual area; (2) The macula, like the rest of the retina, is not represented bilaterally in the cortex; (3) The cortical centre of the peripheral zones of the retina is in the anterior part of the area striata; (4) The superior quadrants of each retina are represented in the upper, and the inferior quadrants in the lower, part of each visual area.

Foreign Bodies in the Globe. This subject has attained such great importance during the War that no apology is needed for enlarging somewhat on what was said in last year's article. Cases of an eye retaining really useful vision after the extraction of a foreign body from the posterior part of the globe are rare. The subject of *prophylaxis* is of great importance. It has been pointed out by Terrien and Cousin[9] that of wounds of the globe in warfare, four out of every five are caused by tiny fragments of projectile with a force insufficient to penetrate the posterior portion of the globe. Against these it is quite possible to protect the eye by the wearing of goggles made of metallic shells, convex outwards, 1 mm. in thickness, and of such a size as to cover the whole orbital cavity and to rest on the orbital margins themselves. The 'seeing part' of each goggle is obtained by two or three fine holes and several slits—one vertical, one horizontal, and the rest intermediate. Unfortunately, the criticism of Lapersonne[10] is probably justified, that these goggles are tiresome for shooting with, and as they diminish the luminosity they cannot be worn at night. Cruise,[11] from an examination of 320 eyes at St. Dunstan's and elsewhere, blinded from war wounds, estimated that 58 per cent of the cases were preventable. His method of prophylaxis is the wearing of a visor attached to the helmet, consisting of a transparent mesh of steel rings so closely linked together that only the most minute particle could pass through its meshes, and then only if it were struck at right angles to the plane of its surface. This visor is now (August, 1917) on its trial on an extensive scale.

When a magnetizable foreign body is in the globe, is it of great importance that its position should be exactly localized by means of the *x* rays before any attempt is made to extract it by means of the magnet? Some hold that it is not, and as it is a matter of considerable difficulty to obtain a skiagram which is of much real assistance in determining the exact position of the particle, and generally involves the delay of at any rate a few days, these advocate the immediate use of the **Giant Magnet** at a time when it is more likely to be effective than at a later period. Others point out that a foreign body drawn forwards by means of a giant magnet may on its way so injure either the ciliary body or the lens as to produce cyclitis or traumatic cataract. These lay stress on exact localization, and advocate an incision through the sclera as near as possible to the position of the foreign body, and the application of either the large or the small magnet to the incision. The former (anterior route) method was advocated by Haab, and has been practised on a large scale during the war by Whiting and Goulden.[12] The latter method (posterior route) is advocated by Pooley,[13] who formerly adopted the Haab technique, but has abandoned it in favour of the scleral route, while still using the giant magnet placed upon the lips of the scleral incision. He believes that three or four days' delay makes no difference to the result, and that unless the situation is carefully localized there is considerable danger of wounding either the ciliary body or

the lens. In the 1916 discussion at the Ophthalmological Society, Whitehead[14] took the same view. Craig,[15] on the other hand, believed that the prognosis depended very much on the shortness of the interval between the infliction of the injury and the extraction of the foreign body. Treacher Collins,[16] while availing himself of Mackenzie Davidson's method of localization where possible, preferred to apply the giant magnet at once rather than incur the risk of any but a very short delay. Gray Clegg,[17] speaking from a large experience at the Manchester Eye Hospital, adopts the anterior route except when there is an actual wound in the sclera.

With regard to the method of applying the giant magnet, Whiting and Goulden[18] give detailed directions, accompanied by illustrations (*Plates XIV–XVII*). These figures speak for themselves; but for details on which the success or failure of the operation may depend the original article should be consulted. The following are the main difficulties that may be encountered: (1) Delay in the passage of the foreign body through the vitreous. In these cases it is sometimes useful to apply the force of the magnet in a series of jerks, the current being rapidly switched on and off with the pedal while the magnet is applied to the centre of the cornea. (2) Entanglement of the foreign body in the iris. In this case the current must be cut off immediately and re-applied with the magnet point in such a position that the line of the current is as much as possible in the plane of the iris, pulling the foreign body backwards rather than forwards until it is disentangled, after which it is easy to get it into the anterior chamber. (3) The presence of a small corneal or corneo-scleral wound with prolapse of the iris. The wound should *not* be utilized or enlarged for the extraction of the foreign body. (4) The presence of a large corneal wound. In such a case the foreign body must be of large size, and the chance of saving the eye is correspondingly slight. There is a considerable danger that iris, ciliary body, lens, or vitreous may be dragged out in the attempt to extract with the magnet, which must therefore be used with extreme caution. (5) The presence of an unhealed scleral wound. In this case the wound, if large, may be utilized for the extraction of the foreign body through it. In any case the conjunctiva and, if necessary, the sclera should be sutured after the foreign body has been removed.

What is certainly in some respects an improvement on Haab's magnet is the **Ring** or **Internal Pole Magnet** (referred to in the MEDICAL ANNUAL, 1911, p. 308). It is in use at Moorfields and at the Birmingham Eye Hospital (Harrison Butler).[19] It consists of an oval ring just large enough to admit the patient's head. This is wound with about a mile of insulated copper wire. In the new model the ring is balanced, and can be used either for a sitting subject or placed round the head of a patient on the operating table (*Fig.* 18). The magnetic field is in the interior of the ring, and a rod placed in the centre is found to have enormous tractive force. For further details the article by Butler should be consulted. The following

PLATE XIV.

REMOVAL OF FOREIGN BODIES BY MEANS OF THE GIANT MAGNET

Showing the general disposition of patient, operator, magnet, and light.

Plates XIV to XVII by permission of 'The British Journal of Ophthalmology.'

PLATE XV.

THE GIANT MAGNET—*continued*

The position when magnet is first applied. Note the hands of operator, and the tilt of patient's head.

PLATE XVI.

THE GIANT MAGNET—*continued*

Arrangement of the recumbent patient for operation on right eye. The position for the left eye is obtained by raising or rotating the patient's head.

PLATE XVII.

THE GIANT MAGNET—*continued*

Applying the magnet for drawing the foreign body through the pupil after it has presented behind the iris below.

are the advantages that he claims for this magnet: (1) The operation can be performed upon a patient lying upon the table. (2) There is no necessity to move him when the splinter has appeared in the anterior chamber. (3) There is no necessity to use a hand magnet. As soon as the splinter is seen in the anterior chamber, the circuit is broken, the anterior chamber opened, and the spicule removed with the spatula. (4) The power of the ring magnet at its centre is great, and is under absolute control. (5) It is much easier

Fig. 18.—The Ring Magnet. The patient is placed on the table, with his head raised upon a pillow. The ring is so adjusted over him that the injured eye lies in the centre of the solenoid. (*By kind permission of* '*The British Journal of Ophthalmology*.')

to operate with the rods upon a motionless patient than to have to move his head this way and that before the Haab; (6) A patient sitting before the Haab may experience pain, and move at the critical moment; he may even faint from the pain.

When once the foreign body has reached the anterior chamber a corneal incision must be made with a keratome, and it is generally easy to extract it. If the Haab magnet is being used it is so unwieldy that it is generally better to use a small magnet for this purpose. Treacher Collins recommends that the incision be made through the

cornea on the opposite side to the foreign body, and that through this a spud be introduced which has been previously magnetized by being touched with the Haab magnet.

REFERENCES.—[1]*Trans. Ophth. Soc.* 1917, 60; [2]*Ibid.* 122; [3]*Ibid.* 112; [4]*Ibid.* 1916, 167; [5]*Ophth. Review*, 1902, 61; [6]*Brit. Jour. Surg.* 1917, Jan., 373; [7]*Trans. Ophth. Soc.* 1917, 92; and *Lancet*, 1917, ii, 1; [8]*Brain*, 1917, May, 57; [9]*Arch. d'Ophthalmologie*, 1915, Nov.-Dec., in *Ophthalmoscope*, 1916, 332; [10]*Trans. Ophth. Soc.* 1916, 197; [11]*Brit. Jour. Ophth.* 1917, Aug., 492; [12]*Ibid.* Jan., 32; [13]*Ibid.* 30; [14]*Trans. Ophth. Soc.* 1916, 63; [15]*Ibid.* 82; [16]*Ibid.* 84; [17]*Ibid.* 86; [18]Loc. cit.; [19]*Brit. Jour. Ophth.* 1917, Jan., 46.

FACE, GUNSHOT INJURIES OF. (*See* JAWS AND FACE.)

FALLOPIAN TUBES, AFFECTIONS OF. (*See* SALPINGITIS.)

FILARIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

J. G. McNaughton[1] records five cases of filarial fever in which the attacks ceased and the filaria disappeared from the blood after a single injection of 0·3 grm. of **Salvarsan** intramuscularly.

REFERENCE.—[1]*Jour. Trop. Med. and Hyg.* 1916, Nov. 1, 249.

FRACTURES. (*See also* WOUNDS, GUNSHOT.)

W. I. de C. Wheeler, F.R.C.S.I.

Hughes,[1] in an interesting communication, draws attention to the *early treatment of compound fractures* of the long bones. He refers to the fatigue, shock, local tissue stupor, and infection in the cases of men wounded in action, in contrast to injuries in civil life. Shock is greatly increased by motor transport if the limb is not securely immobilized. By local tissue stupor he means the condition brought about in the soft tissues as the result of shell injury. The muscle looks dry and lifeless, does not bleed when cut, nor contract when stimulated; in this stunned state the tissue is very prone to infection. The use of a tourniquet and antiseptics may be responsible for the onset of gangrene. Hughes makes the observation that quite a number of wounds in men who have lain out have become fly-blown, and within a very short time contained abundance of maggots. These latter exert an inhibitory action on the growth of virulent bacteria, and seem to hasten the removal of dead tissue. Tourniquets should not be used for transport: as a rule an early amputation is preferable, and owing to tissue stupor it can often be performed painlessly. There need be no attempt made to reduce a fracture until it reaches the casualty clearing station, but it should be absolutely immobilized at the first possible moment. A rifle, sand-bags, and puttees, reinforced by wood from ration boxes, are sufficient material to immobilize a fractured femur, the injured limb being securely fixed to its fellow.

Depage and Vandervelde,[2] in treating open fractures in their ambulance service, rigorously follow the **Carrel Method.** After preliminary stripping and clearance of the wound, the authors have been able to sterilize wounds after a lapse of time of from fifteen

days to a month, and definitely to close them without accident. In effecting the change from an open to a closed fracture, not only the time of treatment, but also that of recovery of normal function, has been shortened. The method pursued may be summed up as follows : (1) On arrival of the patient (in from two to six hours after being wounded) the fractured area is opened up, cleansed, and cleared, leaving only such bone fragments as are clearly vital. Carrel tubes are then placed in position. (2) The wound is irrigated every two hours by Dakin's fluid (Carrel's prescription). (3) The dressings are renewed every day, the wound being cleaned at the same time. (4) Bacteriological control is noted every two days. When the microbian curve remains at 0 after two or three examinations, the wound is sutured. (5) Suture is effected after freshening the edges and removing any cicatricial tissue.

The authors proceeded cautiously to suture in their early cases ; but since November, 1916, all fractures which have been stripped and cleared are regularly closed. They have operated upon seventy-five such cases.

They conclude that an open fracture can recover aseptically. They do not know whether the Carrel method is the only one capable of giving this result, but it is the only one that has given proof of it.

Coller[3] gives minute details of fracture cases in a base hospital. He comes to the same conclusion as do all surgeons experienced in war wounds, that *loose fragments of bone* should not be removed as a routine in comminuted compound fractures. Callus-formation is greatly assisted by the proliferation from these small fragments of bone ; in fact, severely comminuted fractures offer particularly favourable conditions for early and solid union. Coller, unlike most surgeons engaged in war work, thinks that there are a few open septic fractures in which the use of the bone-plate is advisable.

Marshall Flint[4] was struck by the *use of mediæval four-post beds* (which he found in use in one of the hospitals in France) in the treatment of fractures. They adapted themselves so conveniently in providing points of support for the suspension and extension of fracture extremities, and proved to be so comfortable, that the writer copied them for surgical purposes.

Parker Syms[5] described a *tongs for traction* in the treatment of fracture which he believes to be superior to the Steinman pin apparatus. The new tongs only penetrates the bone superficially. The instrument is modelled from the ordinary ice-tongs ; a turn-buckle has been added by means of which the teeth can not only be held firmly in position after they have been implanted, but from time to time they can be tightened by turning a screw.

Fractures of Humerus.—Ladd[6] draws attention to the importance of fractures at the lower end of the humerus, and their frequency in young patients. He agrees with Robert Jones and others that cases have occurred in which the size of the callus had been increased and the amount of motion limited by early passive motion and massage.

There is no doubt that a good many primary results in fractures about the elbow-joint of children are disappointing, even when the Jones hyperflexed position is adopted and good reduction has been secured. It is well to remember, however, that in children, time, by growth, will improve immediate results. Bony prominences resulting from unreduced displacements will often disappear. In cases where good reduction cannot be accomplished, it seems better to reduce the fragments by open operation before treating the injury in the hyperflexed position. The treatment of fractures about the elbow-joints of children has not altered since Treves's monograph on the subject. In substance this monograph pointed out that elbow fractures in children were probably more successful than the immediate results would lead one to suppose, and that limitations of motion, to a certain extent, gradually disappear. Furthermore, the use of passive motion and massage is disastrous, hastening processes which often, under conditions of imperfect reduction, ameliorate themselves with growth and natural use. In adults, apart from bony obstructions, there is often an adaptive shortening of the anterior portion of the capsular ligament. This is due to the continued position of flexion during treatment, and can be relieved by an anterior capsulotomy (*see* MEDICAL ANNUAL, 1916, p. 337).

Forearm Fractures.—These are discussed by Whipple and St. John.[7] They do not hold with the French and English surgeons who recommend arms to be immobilized in the position of extreme supination. If the fracture is in the upper third, the forearm is set in supination and flexed beyond the right angle. At any other site the bones are placed mid-way between supination and pronation, and with flexion beyond the right angle. As against this it seems that in the great majority of old fractures of the forearm admitted into orthopædic centres the loss of full supination is the most striking manifestation of the injury. It is this that has led orthopædic surgeons to recommend full supination as early as possible in all fractures of the forearm.

Colles's Fractures.[8]—There appears to be still a difficulty in treating this common injury. The secret of successful treatment is full reduction of the deformity. The posterior displacement and rotation puts the joint out of true relation to the normal action of muscles. The lower fragment has several grooves over which the tendons glide, and when this displaces backwards there is a check on the movement of the tendons which produces stiffness of the wrist. Reduction cannot be effected by the text-book method of the hand-shake grip. Jones reduces *left* Colles's fracture in the following manner. The surgeon takes the patient's arm in his left hand, with his own scaphoid tubercle against the projecting lower end of the shaft; he then places his right hand on the dorsum of the patient's wrist, with his own scaphoid on the projecting lower fragment; a firm grip with a tractional twist of the wrist completely reduces the deformity (*Fig.* 19). It requires knack rather than strength. The anterior aspect of the

radius has a distinct concavity at its lower end, and the lower margin projects considerably: if this groove is reproduced, reduction is complete. Free movement of the fingers after manipulation of the

Fig. 19.—Reduction of Colles's fracture.

fragments is a sign also that the fractured ends are in good position. A Colles's fracture of many weeks' standing can be reduced under an anæsthetic by manipulation or by a Thomas's wrench (*Fig.* 20).

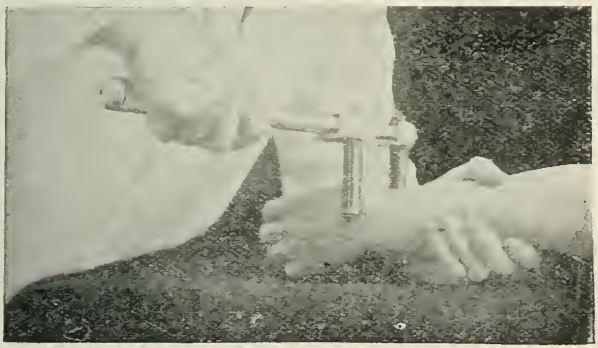


Fig. 20.—Reduction of Colles's fracture.
(*Figs.* 19 *and* 20 *kindly lent by the Oxford University Press.*)

Fracture of Thigh.—Hey Groves[9] does not believe that fixed extension by means of a Thomas splint can infallibly restore the fractured femur to full length in the same way as weight action. He protests against the Thomas's system being described as constant extension and the weight pull as intermittent. He objects to the Thomas splint because it imposes rigidity upon the knee, while the weight system allows this joint to be exercised throughout the treatment. The reflex starting-pains which are generally supposed to be absent when the fractured femur is treated on some form of Thomas splint in fixed extension are, according to Groves, a mythical idea. On the

other hand, there is a large school following the teaching of Robert Jones, which adopts the Thomas splint, or some modification, in the treatment of fractured femur, with more success than experienced by pre-war methods, and believes that surgeons will get the best results if allowed to pursue the methods which they are most competent individually to employ. When using the Thomas splint in fractures of the femur, simple coaptation splints should be also employed at the site of the fracture, and care must be taken, not only to prevent rotation of the foot inwards or outwards, but also to apply the slings in such a way that the natural curve of the femur will be maintained and a future genu recurvatum avoided.

G. A. Moore[10] recommends that fracture of the *neck of the femur* should be treated in the abducted and flexed position instead of the abducted extended position as is common. The leg is brought down to reduce shortening, then the thigh is flexed to nearly right angles with the body abducted as far as possible, and inverted. With the knee flexed at right angles with the thigh, the leg is lifted strongly upwards. With the leg in this position a cast is applied from the ribs down the entire leg, enclosing the foot. On the injured hip the plaster is brought well down over the trochanter. The comfortable sitting posture of the patient is shown in *Fig.* 21. It must be remembered that there is a relaxation of the adductor longus and the iliofemoral ligament of the capsule in the flexed position which does not occur with extension and abduction. In flexion the glutei maximus and medius are very tense, acting as a support to the trochanter and preventing backward displacement and eversion. The glutei muscles act in much the same way as the triceps when fractured elbows are immobilized in full flexion.

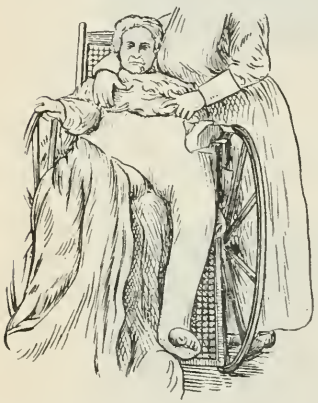


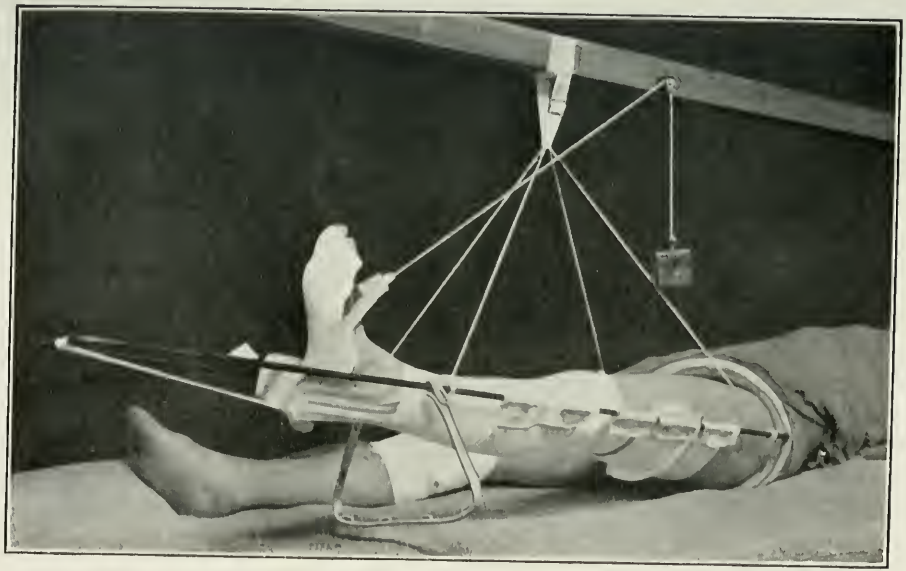
Fig. 21.—Fracture of neck of femur. Front view of cast, taken about eight weeks after application. There is some eversion of the foot; after removal of cast no eversion. (*Redrawn from 'Boston Medical and Surgical Journal.'*)

Max Page and Le Mesurier[11] discuss the *early treatment* of gunshot fractures of the thigh. They point out that for the purpose of transport there can be no question that the Thomas knee-splint is the best arrangement available. They are convinced that in fractures in the lower third of the femur the flexion of the lower fragment is seldom, if ever, completely controlled by a straight Thomas knee-splint. By bending the Thomas splint at the knee level and thus producing a skeleton inclined plane, the results, as far as alinement are concerned, are improved.

As regards splints, the problem of treatment varies slightly during the three periods of transport, infection, and healing. In the period

PLATE XVIII.

GUNSHOT FRACTURES OF THE THIGH



Thomas knee splint applied, and suspended from a beam. A moulded plaster foot-piece, with balance, for cases of foot-drop, is also shown.

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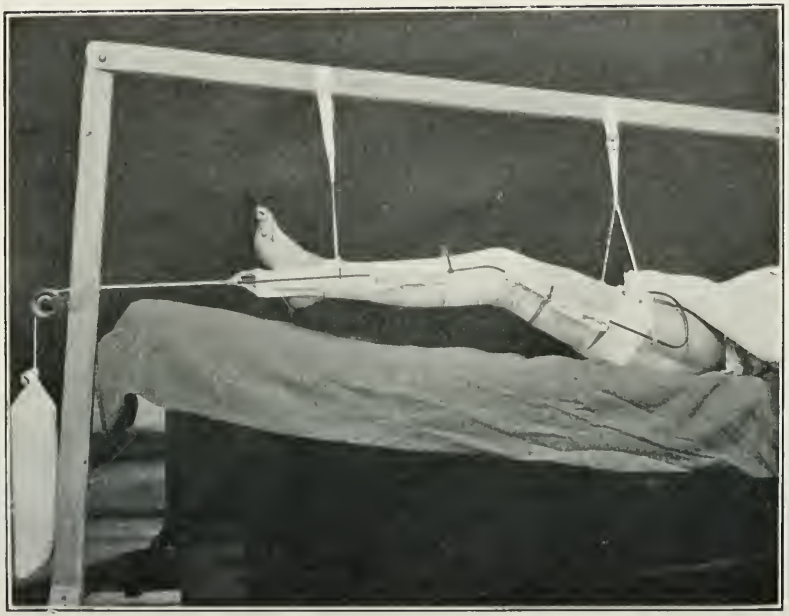
PLATE XIX.

GUNSHOT FRACTURES OF THE THIGH—*continued*



Method of suspension and applying extension in the case of a Hodgen splint.

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of acute infection, the immobilization is continued in a Thomas knee-splint, but a Hodgen splint is recommended for fractures in the upper third. In the period of healing, about the second or third week, the chief object is to secure proper position of the bone fragments. In the case of fracture of the lower third of the bone the leg is pulled out to full or over length under an anæsthetic, and then put up in flexion in a Thomas splint bent at the knee level. Fractures in the middle third are controlled in the classical form of the Thomas splint (*Plate XVIII*). The Hodgen splint gives better results when the upper third is the site of injury (*Plate XIX*). The sling should be very carefully applied beneath the ends of both fragments in fracture of the lower third of the femur treated by a bent Thomas splint, special attention being paid to the sling which controls the lower fragment and prevents a backward flexion.

The important points brought out in this interesting paper are: (1) The Thomas knee-splint is the most suitable apparatus available for transport. (2) The same splint gives excellent results as regards alinement and length in fractures of the middle third of the femur. (3) To get good alinement in fractures of the lower third of the femur, it is necessary to bend the Thomas splint at the knee-joint level and thus form a skeleton double-inclined plane. (4) Fractures of the upper third of the femur can be well treated in a Hodgen splint. (5) Adhesive extension attachments are satisfactory for most cases. (6) Transfixion of the bone is useful in special cases where the procedure is carried out at a distance from an infected area. (7) Periodical prophylactic injections of antitetanic serum are advisable.

Excessive Shortening of the Leg after Fracture of the Thigh can be remedied in various ways, but when all else fails, Ducuing and Uteau[12] cure the man of lameness by shortening the sound leg to correspond. They give an illustrated description of the comparatively simple and harmless technique with which they cut out a strip of the lower third of the femur without any loss of its weight-bearing property.

Pott's Fracture.—The results of treatment of Pott's fracture still leave much to be desired. Eversion of the ankle and posterior displacement of the astragalus often remain. When the patient walks, the tendency is for the astragalus to be thrown towards the space between the tibia and the fibula instead of fairly on the tibia, and the backward displacement prevents proper dorsiflexion. As with Colles's fracture, the primary reduction should be complete. In accomplishing this the knee should be flexed and the heel pulled forwards at the same time as the tibia is pushed backwards; if the foot is then inverted and dorsiflexed to a right angle, the fracture may be considered reduced. The after-treatment is very important. If the patient is allowed to walk before the union is firm, the callus heals and the astragalus throws the external malleolus outwards, producing a painful traumatic flat-foot. It is wise to obtain fixation of the fracture for six weeks, and then the boot of the patient should be raised on the inner side, and in heavy folk a light steel brace should

be attached to the outer side to help the action of the boot. From the first the toe should be turned in during walking.

Fracture of Os Calcis.—F. J. Cotton,[13] discussing fracture of the os calcis, states that the *x* rays show only a confusion of interrupted lines that mean nothing. Cabot and Binney and others have tried to formulate and classify these fractures, but Cotton thinks that this is about as useful as classifying the cracks in a walnut "after the nut-cracker has been through with it." He gives an interesting series of *x*-ray photographs. The rear end of the os calcis is usually pushed up a bit, and the bone is thus decreased in its vertical depth. A more important point in diagnosis is that the lateral diameter is always increased—often greatly so—by a bulging outwards under the external malleolus. The lateral thickening is generally due to the splitting away of a compact plate on the outer side of the bone, and this necessarily displaces outwards the peroneal tendon sheath. There is one other nearly constant factor—the interference of the joints between the astragalus and os calcis leading to the disappearance of lateral motion. Up-and-down movement is preserved. From Cotton's observations there would appear to be three fairly constant features: pushing up of the heel, broadening of the bone outwards, interference with lateral mobility. The results of treatment have been very bad in the past.

Cotton concludes: "My method—or really the method the late Louis Wilson and I worked out together—is as follows: (1) Loosen up the fracture by manipulation. (2) Pull the heel down. We used to put a sound through from side to in front of the heel-cord, and pull down; latterly I use ice-tongs as easier to handle and affording a better grip. (3) Free the joint motion between astragalus and calcis. (4) Push in the displaced bone under the external malleolus: this narrows and shapes the whole bone. We do it by slowly striking with a big mallet on the outer side of the foot: padding with felt to take the blow: supporting the inner side of the foot on a sand-bag (*Fig.* 22). This impacts, and, owing to the fact that the outer plate is firm, the impaction is usually fairly solid. (5) We put the foot up in plaster—not at a right angle, but with the heel-cord slack: also we avoid direct pressure on the heel.

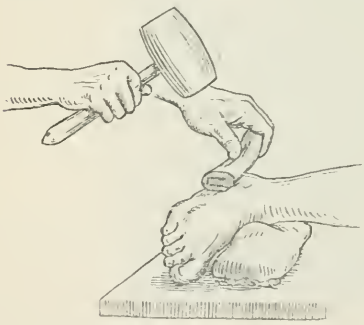

Fig. 22.—Fracture of os calcis: treatment by impaction. The foot is laid on a sand-bag, a felt pad held to protect the outer side of the os calcis, which is then impacted by blows from the mallet. This impaction is used only after careful correction of position. (*Redrawn from 'Annals of Surgery.'*)

"It is well after the impaction to test again as to the presence of lateral motion. If the impaction has impaired it, work the joints

loose again and re-impact. This is rarely needed, however. I have done this impaction many times ; have never failed to get improved position, and have usually succeeded in entirely abolishing the abnormal prominence below the external malleolus, and in restoring the lateral motion and in getting a serviceable impaction. Bringing the heel down where it belongs does not always work out so well, but is less important."

Magnuson[14] also discusses fractures of the os calcis. He recommends division of the tendo Achillis and reduction of the backward displacement of the posterior fragment. In impacted fractures the impaction is broken down in the manner illustrated (*Fig.* 23). The

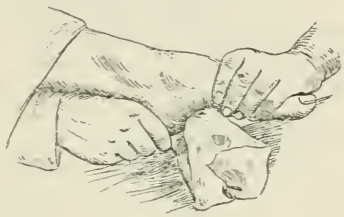

Fig. 23.—Fracture of os calcis. The proper position of the hands on the foot in bringing the heel and the toe close together over an orthopædic block and the reduction of the fracture. If impaction is too firm to be broken up in this way, the foot should be placed in a sand-bag and the posterior fragment struck a sharp blow with another sand-bag which will relieve the impaction. (*Redrawn from the 'Journal of the American Medical Association.'*)

inverted position removes the line of fracture from the external malleolus. The over-arching of the foot, in addition to reducing the displacement, brings the lacerated plantar fascia and ligaments into a state of relaxation. The foot is finally put in plaster in inversion for four weeks, and the patient not allowed to walk for two months. Flat-foot boots should be worn afterwards.

Fracture of the Astragalus.—Baudet[15] says that until the advent of radiography, this was seldom correctly diagnosed, and treatment improperly applied led to very bad functional results. In an injury of the foot from falling on it with a pronounced varus position, and when the pain can be localized over the neck of the astragalus, a fracture of this bone should be suspected, and should be confirmed by radiography. The prognosis as to function is much better in recent years than formerly. The treatment may be simple reduction, operative reduction, operative reposition, or astragalectomy. Simple reduction with immobilization in a plaster cast should be accomplished by the aid of radiography, and should be followed by massage and mobilization. The treatment must be long-continued to get good functional results. It is indicated in simple fractures of the neck with only slight displacement.

Injections of **Milk** suggested in the treatment of ununited fractures (p. 20). *See also* on the value of **X-rays** (p. 41).

References.—[1]*Brit. Med. Jour.* 1917, i, 289 ; [2]*Bull. et Mém. Soc. de Chir. de Paris*, 1917, xliii, 477 (abstr. *Surg. Gyn. and Obst.* 1917, Aug., 133) : [3]*Boston Med. and Surg. Jour.* 1916. ii, 741 ; [4]*Ann. Surg.* 1916. Nov., 613 : [5]*Ibid.* Oct., 500 ; [6]*Boston Med. and Surg. Jour.* 1916, ii. 220 : [7]*Surg. Gyn. and Obst.* 1917, July, 77 ; [8]*Injuries to Joints*, Lieut.-Col. Sir R. Jones (Oxford

War Primers); [9]*Brit. Med. Jour.* 1916, ii, 320; [10]*Boston Med. and Surg. Jour.* 1916, ii, 448; [11]*Brit. Jour. Surg.* 1917, July, 66; [12]*Lyon Chir.* Sept.-Oct., xiii, No. 5, 685–836 (abstr. *Jour. Amer. Med. Assoc.* 1916, ii, 1878); [13]*Ann. Surg.* 1916, Oct., 480; [14]*Jour. Amer. Med. Assoc.* 1917, ii, 539; [15]*Rev. de Chir.* 1915, xxxiv (abstr. *Surg. Gyn. and Obst.* 1916, May, 502.

FRAGILITAS OSSIUM. *Herbert French, M.D., F.R.C.P.*

Fragilitas ossium is apt to be associated with blue sclerotics, and the combination is a malady which may affect many members of the same family in successive generations. The bones break so readily that a child may suffer from fractured femur half a dozen times in as many years, each fracture being due to what should be a totally inadequate cause, such as suddenly turning over in bed. The fractures, though they occur so readily, may all heal well, and the patients may grow up to adult life. Bronson[1] gives a full account of two families affected by the condition.

Reference.—[1]*Edin. Med. Jour.* 1917, April, 240.

FURUNCULOSIS. *E. Graham Little, M.D., F.R.C.P.*

Bowen,[1] with further experience of the method of 'sterilization' recommended by him for this affection as long ago as 1910, finds himself still more satisfied with it, especially in cases which have failed to respond to vaccines. His method is as follows: The patient is directed to take a **Hot Bath** morning and night, scrubbing the whole body, including the head, while in the bath, with soap. It is best to use for this purpose a wash-cloth or a piece of flannel. After this thorough washing, the skin is dried, and the whole surface bathed with a saturated solution of **Boracic Acid** in water, with the addition perhaps of a small proportion of **Camphor Water.** After this bathing, the skin is not to be wiped, but allowed to dry as it is. Then the individual furuncles are treated by dressing them with the following ointment spread on cotton or linen and bound lightly on: boracic acid 4, precipitated sulphur 4, carbolated petrolatum 32. *Every stitch of linen worn next to the skin* should be changed daily, and in the case of extensive furunculosis all the bed-clothing that touches the individual, as well as the night clothing, should be subjected to a daily change. The treatment must be continued for several weeks after the last boil has disappeared.

Reference.—[1]*Boston Med. and Surg. Jour.* 1917, i, 96.

GALL-BLADDER AND BILE-PASSAGES, SURGERY OF.

E. Wyllys Andrews, M.D., F.A.C.S. (Chicago).

The all-important problem in gall-bladder surgery at the present day is, whether the gall-bladder has a function which is not vicariously undertaken after its removal. This forms the sticking-point in the question of cholecystostomy versus cholecystectomy.

Papers by Lund,[1] Porter,[2] Wolff,[3] C. H. Mayo,[4] Deaver[5] have given us the indications for cholecystectomy; also a very interesting work of Guthrie,[6] who collected the opinions of forty-five of our leading

surgeons on this subject. In general it is agreed that cholecystectomy is indicated in (1) Chronic or recurring disease, with or without severe pathology; (2) Thickened gall-bladders or evidently diseased ones (ulcers, etc.); (3) Perforation; (4) Malignancy, or suspicion of it; (5) Obstructed cystic ducts with hydrops or dilatation of gall-bladder as evidenced by dilatation of the common duct; (6) Empyema. Many surgeons prefer simply to drain the more acute cases, recognizing definitely the probable need of future cholecystectomy. General sepsis following the operations on these cases has been frequent enough to warrant the less efficient but safer cholecystostomy.

The real question is, however, what to do with the apparently healthy gall-bladder full of stones, and those not severely diseased, but which experience has taught us are prone to recurrences. It surely is firmly established that cholecystostomy is not a cure-all. We must expect nearly 50 per cent recurrences following drainage, against 20 per cent following excision. The mortality of excision has been reduced to less than 2 per cent in most clinics, and probably would be under 1 per cent if deaths from carcinoma and perforation were excluded. This is practically as low as that of drainage.

We come back, therefore, to the question of the need of a gall-bladder in the organism. This will have to be decided by further work in experimental laboratories and careful following up of our cholecystectomies.

Meltzer[7] points out the contrary innervation of the gall-bladder musculature and the common-duct sphincter, and suggests that a disturbance of their co-ordination may cause a colic when both contract at once. He also points out that the stimulus which relaxes the sphincter is the presence of stomach contents in the duodenum, and lack of this, as in infrequent taking of food, may cause a physiological stasis favouring infection.

Reisman,[8] Cheney[9] and Rehfoss[10] have all discussed this diagnosis of gall-bladder diseases, emphasizing that the text-book description usually omits the commonest symptoms—dyspepsia, hyperacidity, and stomach symptoms due to reflex pylorospasm, and suggest that gall-tract disease is more common than we may suppose. The analysis of bile obtained by the Rehfoss tube from the duodenum, and blood-cholesterol estimations, are regarded as valuable diagnostic aids by Rehfoss.

An interesting contribution to our knowledge of the pathology of the gall-bladder is made by Fowler.[11] He outlines a progressive pathological trend which he divides into three stages:—

1. Cholecystitis catarrhalis subacuta: *Macroscopic*—nothing or slight velvety appearance. *Microscopic*—the villi are broadened, elevated, and infiltrated with lymphocytes. Rest of wall normal.

2. Cholecystitis catarrhalis chronica: *Macroscopic*—yellow spots in mucosa from bile-stained destroyed epithelium. *Microscopic*—villi more thickened, apices denuded of epithelium. Luschka's spaces dilated, submucous and muscularis infiltrated with lymphocytes. Latter hypertrophied.

3. Cholecystitis chronica: *Macroscopic*—unmistakable evidences of chronic inflammation. *Microscopic*—entire wall affected. Mucosa lacking or scarified. Whole wall infiltrated by lymphocytes, muscle largely replaced by scar tissue. He also mentions the hæmorrhagic and phlegmonous types.

From these facts he reasons that cholecystitis is a definitely progressive inflammation with an assured continuance to the stage of cholecystitis chronica, and therefore cholecystectomy is the only rational treatment.

Eisendrath[12] gives some very interesting pictures illustrating the likelihood of overlooking common-duct stones in routine palpation, and urges probing of the ducts after cholecystectomy through the stump of the cystic duct, pointing out the ease with which this may be done if the cystic duct is cut off near the common, i.e., below the valve (*Fig.* 24).

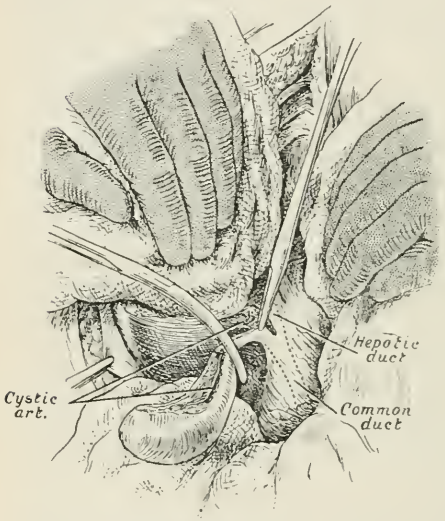

Fig. 21.—Gall-bladder completely free. Cystic artery ligated. Clamp applied on cystic duct distally and artery forceps proximally to steady stump for probing. (*Redrawn from the 'Journal of the American Medical Association.'*)

Ginsberg[13] and Phemister[14] each report successful cases of autogenous fascial reconstruction of the common bile-duct. Panchet[15] contributes a well-illustrated article on duct repair and fistulas. He uses rubber tubes, and reinforces his repair with peritoneal folds. He describes precautionary measures to avoid injuries to the ducts during cholecystectomy.

McArthur[16] points out the value of temporary cholecystostomy in gastric surgery. In view of the enormous capacity of the duodenum to absorb fluids, he has used the open gall-bladder to introduce salines and other fluids. The liquids are allowed to flow in under 12 to 20 in. pressure at the rate of five to ten drops per second. Adrenalin has been thus injected for shock; also mild alkalies to combat acidosis. For feeding, 2 per cent dextrose or peptones were used. The gall-tract mucosa will only tolerate neutral or weakly alkaline solutions, and of no greater density than blood.

Seelig[17] makes a very able plea for the removal of the gall-bladder from the fundus downward. He says that the added hæmorrhage from the older method is negligible, and easily controlled by a gauze sponge held on the liver. The exposure of the artery and the ducts

is so much easier and more certain that he now uses this method almost exclusively. Dissections have shown us recently that anomalies in this region are almost the rule rather than the exception, and the difficulties of searching blindly for the cystic duct or artery to ligate them separately are extreme. In about one-third of the cases surgeons have been compelled to clamp and ligate the pedicle *en masse*. This is never necessary by the old method. It is also much easier to cut off the cystic near the common duct, and easier to probe the ducts. By the method from below upwards one hesitates to loosen the clamp, which is often applied blindly, because it may contain a spurting artery which will retract and obscure the field with a subperitoneal hematoma. In France and Germany, where removal of the gall-bladder from the fundus downward is the routine, there is much less literature on injuries to the bile-ducts than in America, where evidently the ducts are more frequently injured and where the other method is used.

X-ray diagnosis in affections of gall-bladder (p. 47).

References.—[1]*Surg. Gyn. and Obst.* 1917, Mar., 275 ; [2]*Jour. Amer. Med. Assoc.* 1917, Aug., 158 ; [3]*Hygieia*, 1916, May, lxxix, 417 ; [4]*Surg. Gyn. and Obst.* 1917, Mar., 281 ; [5]*Ibid.* 1917, Mar., 284 ; [6]*Jour. Amer. Med. Assoc.* 1916, ii, 653 ; [7]*Amer. Jour. Med. Sci.* 1917, ii, 469 ; [8]*Ibid.* 492 ; [9]*Ibid.* 477 ; [10]*Pennsyl. Med. Jour.* 1916, xx, 166 ; [11]*Amer. Jour. Med. Sci.* 1917, i, 497 ; [12]*Jour. Amer. Med. Assoc.* 1917, i, 968 ; [13]*Ann. Surg.* 1917, Jan. ; [14]*Surg. Clinics*, Chicago, 1917, 553 ; [15]*Presse Méd.* 1917, Feb., 89 ; [16]*Journal Lancet*, 1916, xxxvi, 723 ; [17]*Surg. Gyn. and Obst.* 1917, July, 45.

GANGOSA. *Sir Leonard Rogers, M.D., F.R.C.P.*

D. A. Turkhud[1] records and illustrates a case of gangosa or rhinopharyngitis mutilans of three years' duration met with in Bombay in a Hindu female, age 40. A positive Wassermann reaction was obtained, and eosinophilia found. No known pathogenic organisms were found in scrapings.

Reference.—[1]*Ind. Med. Gaz.* 1917. Feb., 53.

GANGRENE. *Herbert French, M.D., F.R.C.P.*

The great difficulty of dealing with the nauseating stench in cases of inoperable moist gangrene of the leg is familiar to most of us ; and the method of treatment by **Hot Air** and **Alcohol** advocated by Gilman Thompson[1] is likely to be welcomed by those who are confronted with such a case. His patient was an elderly lady with bad vessels and heart, in whom operation was out of the question. The sloughs were treated with aristol, potassium permanganate, aluminium acetate, and a variety of other applications, but the odour became unbearable—so much so, in fact, that it permeated the entire house, and more than once caused the nurses to vomit after attempting to dress the foot. Thompson obtained an electric toaster and an electric fan, and enclosed them in an asbestos tube which led from the toaster to the foot. The fan furnished a constant current of air, which was superheated in passing over the toaster, and directed across

the foot day and night. (*See Fig.* 25.) The relief of pain which ensued was remarkable, and the patient's incessant moaning and restlessness ceased. By this means the superficial tissues were soon mummified, but every few days a deep slough would open up, and the nauseous stench returned. He then resorted to 95 per cent **Alcohol,** and, keeping the entire foot saturated with it, the odour was again controlled, as well as extension of the gangrene. Previous to these two methods of treatment, œdema, with purplish mottling of the skin, spread half-way up the leg, so that it was feared at one time that the process would extend to the knee. Then followed a series of 'amputations,' first of the toes, then of metatarsal bones, and finally of the astragalus (which proved very refractory), all bones being removed

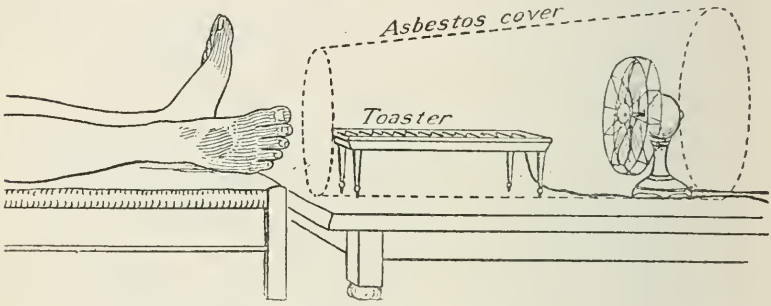

Fig. 25.—Home-made apparatus for treatment of gangrene by hot air. The air current, directed by the electric fan, is heated in passing over the electric toaster, A sheet of asbestos covers the apparatus.

with a pair of dressing scissors. The entire time from the onset of the gangrene until the complete removal of the foot was fourteen months. Immediately thereafter a healing process began, and, aided by liberal application of **Balsam of Peru,** at the end of four months more the stump was as completely covered with normal skin as if a primary operation had been performed, which the family had refused, and which the patient's cardiac condition and age practically precluded.

Much interest and importance attaches to the question whether to advise operation or not in the types of peripheral gangrene above described, and it is impossible to formulate definite rules. The matter, however, is often decided by the patient, who refuses amputation, and prefers to take his chance with the spontaneous outcome of the lesion. It is customary in this event to resort to wet dressings with such solutions as those of aluminium acetate, weak alcohol (10 per cent), potassium permanganate, iodoform, iodine, 'red wash,' etc., but in Thompson's experience much more satisfactory results are obtained by the dry treatment with superheated air, reinforced, when the odour becomes unbearable, by **Absolute Alcohol** rather than by the weaker solutions.

REFERENCE.—[1]*Med. Rec.* 1916, ii, 1103.

GANGRENE, PRE-SENILE. (*See* Thrombo-angiitis Obliterans.)

GAS GANGRENE. (*See also* Gunshot Wounds.)

Deputy Surg.-Gen. A. Gascoigne Wildey, R.N.

It is now generally accepted that gas gangrene occurring in gunshot wounds is a disease of the muscle tissues. It follows upon the action of certain anaerobic saprophytes of fæcal origin, which, on obtaining access to devitalized muscle tissue, are capable of establishing themselves therein, and by the action of the products of their growth induce the death of adjacent healthy muscle fibres, which in turn are attacked and digested. A continuance of this process in the long direction of the fibres manifests itself in characteristic forms of gangrene, usually accompanied by the formation of gas, and by symptoms of toxæmia. The infecting organisms may find a suitable starting-place for growth in blood-clot or in any necrotic tissue, or they may be introduced in such force on particles of clothing, etc., that they are able to resist, for a time, the physiological defences of the body, and to develop their toxins; but in such cases, *when muscle tissue is not involved*, the disease does not assume the 'classic' rapidly-spreading form of gangrene; it then remains localized as a 'gas abscess.'

Experienced observers in clearing stations[1] record that during periods of many months no cases were met with in which gas gangrene was found to begin as a subcutaneous infection, injured muscle being in all cases the primary focus. When gas gangrene has originated apparently in subcutaneous tissue, Lardennois and Baumel[1] have observed that it occurred where subcutaneous muscle existed, i.e., in the neck and back, and remained limited to these areas. Inoculation experiments seem to support these observations, since laboratory animals are more successfully inoculated by injections into muscles than by injections into subcutaneous tissues.[2]

The presence of gas is not a constant sign in so-called gas gangrene. On this subject Bashford[3] writes: "The production of gas is a late, and really a subsidiary, phenomenon, which attracts attention from its mere peculiarity. I have not found it plays any part in the advance of infection, although it contributes to the later swollen condition. It arises in tissue long dead; for this reason the term 'gas gangrene' is unfortunate, from the fact that it implies the necessity of awaiting the detection of gas before making a diagnosis." He suggests the term 'acute bacillary gangrene' or 'war gangrene.'

Of the many varieties of anaerobic micro-organisms associated with the gaseous or the œdematous forms of the disease, the *B. capsulatus welchii* (*perfringens*) and *Vibrion septique* are of such supreme importance that, with the exception of *B. histolyticus* and *Hibler IX*, all the others sink by comparison to insignificance. Some, like the *B. œdematicus*, are no longer credited with any active part in the actual production of tissue-death. Many observers note that either

the perfringens or the *Vibrion septique* is met with in every case. Often the two are found together.

Vis-à-vis with an early case of gas gangrene, the practical surgeon is concerned, bacteriologically, not with the whole flora of the infection, but with the following questions: Is the perfringens present without the *Vibrion septique*? Is the vibrion present without the perfringens? Is a streptococcus infection associated with either or both of these bacilli? With positive information on these points he is in a position to form an opinion upon the severity of the infection, and the probable course of the disease under appropriate treatment. When this information is supplemented by radiograms showing by the arrangement of the gas spaces whether the gangrenous process is localized or spreading through the muscles, he can differentiate, even in the earlier stages, the favourable from the hopeless cases.

The perfringens is found in nearly every case of gas infection. When unassociated with either the *Vibrion septique* or with the streptococcus, the disease is comparatively benign, and in the early stages yields to prompt surgical treatment unless it is so deeply seated that drainage is ineffectual. When perfringens is associated with the vibrion, a rapidly fatal termination may be expected. Lardennois and Baumel state that together these bacilli augment each the virulence of the other. The *Vibrion septique* alone is uncommon. Its presence is of grave import. When the streptococcus is added to either of these infections the severity of the disease is enormously increased, leading to a high mortality from streptococcal septicæmia. The perfringens and vibrion are Gram-positive in the discharges from infected wounds, thus allowing immediate provisional diagnosis to be made from smears. In cultures the perfringens and vibrion can be distinguished readily from one another by the creeping movements of the vibrion. In smears the identification may be less easy. The perfringens is generally shorter than the vibrion, and displays a distinct capsule. It rarely spores. It makes no progression when motile. Both bacilli have square ends. The *Vibrion septique* frequently contains spores which are either terminal or subterminal. Many of the less significant bacilli, of which several new varieties are recorded, are commonly associated with the active agents; their identification becomes of importance chiefly in the preparation of cultures for vaccine and serum therapy. Weinberg, in making these preparations, has discovered three microbes differing from the perfringens and *Vibrion septique*. He terms them *A*, *B*, *C*. Moreover, he finds six varieties of *B* and *C*. Among the more recently isolated microbes are the *B. sarco-emphysematicus hominis* and an anaerobic streptococcus.[4]

While there is a consensus of opinion that a muscle infection is a necessary starting-point for the spread of gas gangrene, histologists are still divided as to the factors—mechanical, physiological, and chemical—which affect the rapid spread of the disease. Since the anaerobic organisms responsible are non-pathogenic saprophytes, and

may be present without harmful results in wounds free from necrotic tissue, and subcutaneous inoculation experiments with these bacilli are seldom fatal to animals, the rapid invasion of healthy tissues when once the disease is established is difficult of explanation. The disease tends to spread up and down the infected muscle, and to confine itself to muscle groups unless a streptococcal infection is added, causing suppuration extending along the fascial planes, or in cases when the main blood-supply is cut off, when the destructive process spreads from one muscular region to another along the course of the blood-vessels. That this spreading in the direction of the muscle fibres is due chiefly to the death of successive portions of tissue from the action of exotoxins formed by the growth of the bacilli, has been generally conceded. The gas evolved by the decomposition of the muscle sugar is not considered to be in itself a toxic factor, but by the mechanical effects of its pressure it may contribute to the necrotic processes. Histologically,[2] at the spreading margin the muscle fibres are found to be swollen and separated completely from the interstitial tissue, leaving apparently clear spaces. When separation has taken place, colour changes in the muscle fibre are noted and striation has disappeared. The anaerobic organisms may be found far beyond the edge of the gangrene in the interstitial tissue between the healthy fibres. McNee and Dunn[2] do not believe that these spaces are filled by gas alone, causing the death of muscle fibres by pressure. They are of opinion that "a toxic fluid, perhaps similar in constitution to the œdema which always accompanies gas gangrene to a greater or less extent, spreads along between the interstitial tissue and the fibres, killing the latter as it advances. Once the fibres are killed, the anaerobic bacilli live on them practically as saprophytes, breaking down the sugar and producing abundant gas." These observers offer no opinion on the nature of the toxic fluid.

Wright[5] calls attention to the erroneous belief that *B. welchii* (*perfringens*) cannot grow in the presence of air. He refers to the half-forgotten experiments of Tarozzi, Ori, and Wryosek, proving that when pieces of animal or vegetable tissue are added to bouillon, cultures of anaerobes can be obtained in open tubes. In repeating these experiments, he states that so far he has not obtained from a wound any anaerobe which could not be made to grow freely when exposed to the air. He points out that these experiments do not prove that these organisms are unaffected by the presence of oxygen, since it may be possible that the particles of animal or vegetable matter may provide some reducing agent capable of holding off the oxygen of the air, permitting the microbes to get a start, the subsequent growth being due to anaerobic growth in a medium deprived of air by the generation of gas in the culture. "We are then called upon to modify our faith in the doctrine that the growth of anaerobes pivots upon the presence or absence of oxygen." Convinced that such presence or absence of oxygen is not the controlling factor of growth of the perfringens, Wright looks for other factors. He investigates

the restraining bactericidal action of serum, and shows by experiment that the survival of implanted microbes is to a great extent dependent on their initial concentration. Concurrently with growth is a reduction of the antitryptic powers of the medium, and acid is elaborated. Wright's previous experiments led to the belief that this antitryptic action of blood-fluids is the body's chief defence against all micro-organisms. Thus, having once established itself, the perfringens creates an ever-increasing favourable condition for further growth. By other experiments he shows that infection by the perfringens produces a local and general acidosis. He holds that the toxæmia of gas gangrene is an acidæmia. This leads him to the consideration of the possibilities of treatment by **Alkalies**, either by intravenous injection or by local injection alone or in combination with a strongly alkalinized serum. Wright records two cases of gas gangrene with acute toxæmia treated by alkaline intravenous injections in addition to amputation of the affected limbs. A 'dramatic' recovery followed in each case. In four other cases of profound toxæmia the treatment was ineffectual.

Bashford[4] holds that the bacilli are not essentially 'muscle feeders,' but live on lymph spaces which represent the endomysium. He believes that the destruction of capillaries, veins, and lymphatics, by the products of bacillary growth, is the outstanding feature of the rapid spread of the infection in muscles. He explains the restriction of the most serious forms to long muscles as due to the vascular arrangements, and to the large masses of tissue which become suddenly involved, the spread of infection being promoted, not only by the actual severance of the blood-supply, but also by thrombosis, coagulation, or stagnation of the blood, and by stagnation in the lymphatic circulation. He maintains that to be efficacious the attack on the infection would have to be brought to bear on the deteriorating minute vessels in the deep, still-living tissues, securing for them adequate protection by constantly maintaining the circulation at a high level, so as to prevent intravascular coagulation and hæmorrhage from extending into healthy tissues. The good effect of incisions results more from relieving stagnation of circulation than from the "hypothetical injury the admission of air to the tissues is supposed to inflict on the bacilli."

Bull and Pritchett[6] believe that the general symptoms are due to an exotoxin which is a complex of hæmolysin and another poison acting locally on the tissues and blood-vessels, thus causing œdema and necrosis and probably exerting a general toxic effect in addition. They claim to have produced a protective and curative serum obtained by successive injections of carefully-graded doses of toxic filtrates of cultures in rabbits and pigeons.

Pathologically the affected muscles are at first swollen and greenish in colour, and friable; later the muscle is deep green and full of gas. Beyond the gangrenous area there may be considerable œdema. The serous fluid is reddish-yellow, containing red corpuscles but no leuco-

cytes. It is highly infectant but not inflammatory. It may contain bacilli even when taken from a considerable distance from the wound. When there is much œdema the muscle appears to be washed with a clear green colour. When there is little œdema but much swelling of the muscle this colour is more brown than green. Wallace describes a brick-red condition of the muscle when dead from infection, anterior to the green stage. This he calls the 'red death.'[7] The colour he describes is quite different from the purplish-brown of a muscle dead from the cutting off of the blood-supply.

The broad topographical division of cases into epifascial and subfascial forms is likely to be discontinued now that the muscle origin of the disease is becoming recognized. Of the many classifications of its clinical aspects, the writer selects that of Lardennois and Baumel,[1] whose admirable contribution to the literature of anaerobic infections is here freely quoted. Clinical forms: (1) Localized malignant tumefaction (the term 'phlegmon' is avoided), with or without œdema, sometimes with bronzing of the skin; (2) Localized gangrene with gas; (3) Localized gangrene without gas; (4) Diffuse gaseous gangrene; (5) Benign gaseous abscess; (6) Gaseous slough.

Localized malignant tumefaction without œdema may appear within twenty-four hours, sometimes within six hours, of injury, or it may be delayed for from four to six days. It forms a softish, somewhat irregular swelling, distorting the contour of the limb, extending 15 to 20 cm. beyond the wound in each direction. The skin is pale and marked with reddish venules. This is the first stage of gangrene and the signal for alarm. The patient is obviously ill, anxious, and agitated. The pulse and temperature are raised. When the swelling is incised there escapes a little infiltration-fluid from the cut tissues, which are pale. The fat is salmon-pink, the muscles of a Vandyke-brown colour with ecchymoses, herniating from the opened aponeurosis. A falling temperature and a rising pulse mark the approaching end, which is often sudden. *The form with œdema* occurs about the sixth day. The œdema appears above and below the wound. It 'gives to the touch,' but without pitting. The skin is pale, like 'old ivory,' with patches of dark violet. Pulse and temperature remain normal during many hours of the day. When incised, a reddish gelatinous œdema is found in the subcutaneous cellular tissue and in the intramuscular spaces. The muscles are swollen and bright green. This form is especially treacherous. It can be fatal in a few hours. If its course be prolonged, the cellular tissue presents bronze patches due to blood effusions. Left to itself this malignant œdema may prove rapidly fatal from bulbar intoxication, or it may develop towards a gaseous gangrene which progresses with extreme rapidity and kills in twelve to twenty-four hours. These *localized tumefaction forms*, from the absence of gas as a prominent sign, are less easily recognized in the early stages. Their extreme malignancy calls for special attention.

Localized gangrene is not uncommon in deep narrow wounds which

have not been opened up. The entrance is found blocked by a brown scab. When insufficiently opened and imperfectly drained, some reddish serum escapes, and some gas bubbles may appear on slight pressure. There is pain, limited swelling, and a quickened pulse. Upon a deep incision being made, a burrow is found where degenerated, digested muscle fibres are seen hanging in friable shreds. These fibres are covered with dirty-yellow pultaceous granulations. The muscle is found diseased for a considerable distance from the wound. Untreated or insufficiently treated, localized gangrene generally becomes diffuse.

The clinical appearance and course of *diffuse gaseous gangrene*, the 'classic' form, are now well known. They need no restatement.

Benign gas abscesses have been noted in the cellular tissues of regions where subcutaneous muscle fibres, such as the platysma, exist. They are always limited, and are cured by incision and drainage.

The benign gaseous slough is found on amputation flaps. The slough progresses slowly without affecting the general health. Both the benign forms are attributed to the perfringens.

TREATMENT.—*The preventive treatment* of gas gangrene is the early thorough surgical toilet that should be given to all gunshot wounds known to have been exposed to anaerobic infection—a toilet that includes the removal of all foreign bodies, blood-clot, and damaged or possibly infected skin, cellular tissue, and muscle; the cleansing of the wound with such antiseptics or inhibitory applications as may seem expedient, and the provision of efficient drainage. The experimental work of Bull and Pritchett[6] encourages the hope that a protective serum will soon be added to the routine preventive measures.

When gas gangrene is diagnosed, and there is a possibility of saving the limb, the primary focus must be explored, and all infected muscle tissue resected until healthy, contractile, bleeding muscle is reached. Complete ablation of a muscle or group of muscles may be necessary. Frankau, Drummond, and Nelligan recommend the following *after-treatment*:[8] (1) The dressings are reduced to the minimum, that is, one or two layers of gauze placed over the wound to allow for access of air. Exposure to sunshine. (2) Constant or intermittent irrigation by some modification of the Carrel method with **Eusol**, **Saline**, or **Hydrogen Peroxide.**

Ivens calls attention to the necessity of avoiding all pressure when immobilizing fractures. To this end, when using Thomas's splints, they should be made with specially large rings.

It is impossible to lay down definite rules as to when amputation should be performed. Many lives are saved and useful limbs secured by extensive ablation of muscles. In making a decision, the recognition of the bacillary flora of the wound, and a study of the arrangement of the gas distribution as shown by radiography, may be of the greatest assistance. When amputation is necessary, a rapid flapless method is performed.

PLATE XX.

GAS GANGRENE

(DR. WEINBERG.)

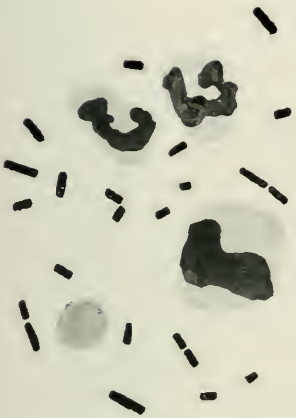

Fig. A.

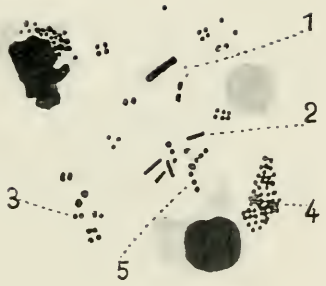

Fig. B.

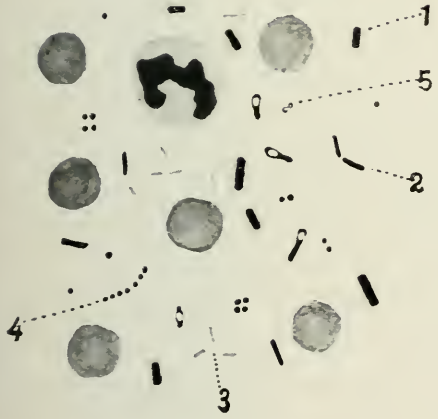

Fig. C.

Fig. D.

Fig. A.—Classic form of gas gangrene. The discharge from the wound shows only the *B. perfringens* and leucocytes.

Fig. B.—Classic form of gas gangrene. Discharge from wound: (1) *B. perfringens*: (2) Cœur jaune; (3) Diplococci; (4) Staphylococci; (5) Streptococci.

Fig. C.—Classic form of gas gangrene (putrid variety). Discharge from wound: (1) *B. perfringens*; (2) *B. sporogenes*: (3) Proteus (Gram-negative); (4) Streptococcus; (5) Diplococci.

Fig. D.—Toxic form of gas gangrene (putrid variety): (1) *B. œdematicus*: (2) *B. sporogenes*; (3) Cœur jaune.

Plates XX and XXI by kind permission of the 'Glasgow Medical Journal.'

PLATE XXI.

GAS GANGRENE—*continued*

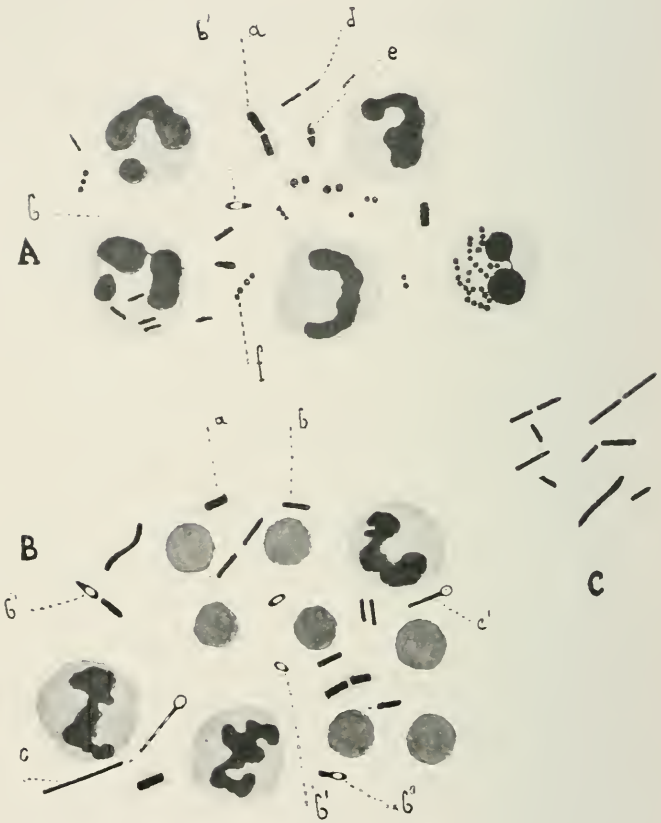

Fig. E.

Fig. E.—Classic form of gas gangrene. Patient died from septicæmia caused by *Vibrion septique*: (*A*) Discharge from the wound—(*a*) *B. perfringens*; (*b*) *Vibrion septique*; (*b'*) Spore of *Vibrion septique*; (*d*) Cœur jaune; (*e*) Diplococci. (*B*) Discharge from muscle taken far from the wound: (*a*) *B. perfringens*; (*b, b'*) *Vibrion septique* and its spores; (*c*) *B. tetani*. (*C*) Culture of *Vibrion septique* obtained by hæmoculture (the blood was inoculated in broth twelve hours before the death of the patient).

Ivens[9] finds **Serum Therapy** of value in border-line cases, to prevent the spread of infection after amputations or incision through the infected areas, and to limit amputations; **Vaccines** are also employed. The treatment of acute toxæmia by intravenous injections of **Eusol** has found favour. Wright has had some success with intravenous injections of **Alkalies.**

Kenneth Taylor[9] calls attention to the risk of secondary hæmorrhage during the use of Dakin's solution, on account of its feeble bactericidal action on the bacteria of gas gangrene, its digestive action on blood-clots, and the insecurity of catgut ligatures in its presence. His remarks are summarized in the article on Wounds, Gunshot. (See *Plates XX and XXI.*)

References.—[1]*Presse Méd.* 1916, Nov. 16, 506; [2]McNee and Dunn, *Brit. Med. Jour.* 1917, i, 727; [3]*Brit. Jour. Surg.* 1917, April, 562; [4]*Brit. Med. Jour.* 1917, i, 466; [5]*Proc. Roy. Soc. Med.* 1917, Feb.; [6]*Brit. Med. Jour.* 1917, ii, 432, quoting *Jour. Exper. Med.*, Baltimore, 1917, xxvi, 119–138; [7]*Brit. Med. Jour.* 1916, ii, 381; [8]*Proc. Roy. Soc. Med.* 1917, Feb., 29; [9]*Jour. Amer. Med. Assoc.* 1917, i, 1533. Plates, Weinberg, *Glasgow Med. Jour.* 1916, April, 252.

GAS POISONING FROM EXPLOSIVES.

Herbert Freneh, M.D., F.R.C.P.

C. H. Symons[1] records the clinical effects of the gases emanating from explosives on board ship. H.M.S. *Russell* was struck by two mines, and her after-part caught fire. Later, an explosion occurred in the after turret. It is certain that in the after-part of the ship there were large quantities of fumes from burning explosives, chiefly cordite, and that many officers and men inhaled these fumes. Seventeen officers and men were subsequently treated in the R.N. Hospital, Malta, suffering from poisoning by some of these gases. After their rescue these men did not notice anything wrong with themselves except that they felt a little shaken by their experience. They returned to the depôt, where they were going about in an apparently normal state of health. Suddenly, about four hours later, an officer who had seemed to be quite well became ill, collapsed, and was brought to hospital, where he died within twenty minutes from syncope. From this time onwards, others, who also gave a history of having inhaled these fumes, began to feel ill and were admitted to hospital. One man had no symptoms of any sort until seventeen hours after inhaling the fumes.

Symptoms.—Severe headache was present in nearly all the cases. Vomiting was also an early symptom. There was irritating cough, with slight frothy expectoration; in one case this was said to have been tinged with blood. The temperature was raised to about 100°, and the pulse was quite regular, with good volume and tension, and only slightly increased in frequency. The skin was cold and clammy. The patients in this stage did not seem to be very ill, and it was thought that rest in bed was all that would be required. They certainly gave no indication of the extremely grave condition that subsequently arose.

Within the next three hours the cough became very much worse and extremely irritating, the secretion more profuse, and the breathing shallow and rapid. This condition became rapidly worse and worse. There was extreme cyanosis of a dusky slate colour; the patient was restless and distressed, and sat up in bed fighting for breath, complaining of choking, and imploring to be allowed to get up or to have something done to relieve him from his agony of dyspnœa. The dyspnœa tended to grow alternately better and worse in paroxysms. The respirations reached as many as 96 per minute in one case, and were usually about 80. The breath sounds were harsh, and loud bubbling sounds were heard all over the chest. The heart became dilated. The pulse became low-tensioned, collapsing in character, and much increased in frequency; the volume was good. Two cases were observed to have periods of unconsciousness of short duration, but the majority of the patients were only too conscious of their sufferings. In the more acute cases death occurred from syncope in twelve to thirty-six hours.

Treatment.—Patients were put to bed and ordered light diet. They were made warm and treated on general lines at first. Later on, hypodermic injections of **Pituitrin** in 1-c.c. doses, repeated in three hours, and **Digitalin** $\frac{1}{100}$ gr. were given. Brandy was also given in 1-oz. doses. No benefit was obtained from these. **Oxygen** bubbled through rectified spirits seemed to improve the colour a little, but was not of much use. **Atropine,** in doses of $\frac{1}{100}$ gr. was given hypodermically with a view to checking the bronchial secretion, and seemed to be beneficial in some cases. **Morphia** had been given to some of the cases, who were burnt before the respiratory symptoms appeared, and may have had a bad effect upon the latter. One patient, who was not taken ill until seventeen hours after the 'gassing' had occurred, was treated in the recumbent position with the foot of the bed raised; **Oxygen** was given, also **Atropine,** and later on **Digitalin. Venesection** was performed fourteen hours after the onset of the symptoms, and ten ounces of blood were drawn off. No immediate relief followed this procedure, but he ultimately recovered after being in an extremely critical condition for thirty-six hours.

In the combustion of these high explosives carbon monoxide and carbon dioxide are produced, but poisoning by these gases can be excluded by the following evidence: Poisoning by CO was excluded in that: (1) The symptoms did not appear until some hours had elapsed; (2) The colour was dark, and not the pink hue produced by carboxyhæmoglobin; (3) There were no convulsions. Poisoning by CO_2 was excluded in that: (1) The symptoms were so long delayed; (2) There was absence of painful sensations in the nose and ears; (3) There was no sleepiness, and no loss of muscular power was noticed; (4) Though two patients at least were noticed to be insensible at intervals, coma was not a marked feature. The other gases produced in large quantities are NO and NO_2, and it is most probable that the effects described were due to one or both of these gases.

The condition indicates that the poison produces an extreme degree of irritation of the lungs, going on to acute congestion and eventually producing death by heart failure from mechanical obstruction to the blood-flow. The changes in the lungs might be produced by direct mechanical irritation, in which case the symptoms would be expected to begin earlier, and to tend to pass off as the gas was eliminated by respiration. It might act indirectly upon the lungs through the central nervous system, but the delayed onset of symptoms again renders this unlikely. It might be that the gas as it is absorbed is not at all, or only slightly, poisonous, and that it is changed by chemical processes either in the lungs or in the blood into a highly irritating substance, which produces the above-mentioned pulmonary congestion. If this occurred in the alveoli of the lungs the *rationale* of the treatment by **Emetics** and **Aromatic Spirits of Ammonia** would be apparent, as, by bringing into play the extraordinary muscles of respiration, the gas would be eliminated before being changed into a toxic substance. This theory would also help to explain the delayed onset of symptoms. **Purging, Low Diet, Recumbent Posture,** and **Bleeding** are all means of relieving the strain on the overtaxed heart.

The gas NO is oxided in air to NO_2, and NO_2 in the presence of excess of water forms nitric acid, which would be neutralized by any alkali. Therefore, in order to prevent these gases from being inhaled, it would be sufficient to use the respirators, with the moist alkaline chemicals, at present supplied in ships, according to the instructions laid down.

Reference.—[1]*Jour. R.N. Med. Service*, 1916, Oct., 513.

GAS POISONING IN MINES. *Herbert French, M.D., F.R.C.P.*

Louis G. Irvine[1] gives an extensive account of the effects of various poisonous and asphyxiating gases as they affected men accidentally in the mines in South Africa. The original paper should be consulted for many details. The gases he deals with come under two headings, viz.: (1) Those arising naturally in the mines—carbon dioxide, CO_2; methane, CH_4 ('fire-damp'). (2) Those arising from explosive charges used in mining operations—carbon monoxide, CO; nitrous fumes, mainly NO_2; sulphuretted hydrogen, HS; sulphurous acid, SO_2. He also discusses the effects of oxygen deficiency, and its fatal results. He gives the immediate symptoms and the later effects in each case, indicates how the poisonings arise and how they are to be avoided, and deals with the scope and use of rescue appliances.

First-aid Treatment.—In all cases of gas poisoning, prompt and efficient first-aid treatment is of the first importance. The following points are to be remembered in attempting rescue :—

1. When a gassing accident happens, the first thing to do is at once to turn on **Compressed Air** into the place in which it has occurred, and keep it turned on throughout. This at once supplies with purer air those who are overcome, and makes it safer for rescuers to enter the danger zone. It seems an obvious precaution, but neglect to do

so has not infrequently resulted in disaster to those attempting rescue, and in fatal delay in extricating those already overcome. No one should enter the danger zone until it has been well blown out for several minutes.

2. *No man must enter the danger zone alone.* Loss of life has occurred from this. Four men are the proper number to form a rescue party, so that if one is disabled the others may be able to help him. Men who have already been engaged in rescue work should not enter the danger zone a second time if fresh men are available.

3. Rescuers should carry with them one or two candles to test the air, and also electric lamps, or, failing these, acetylene lamps. *Never* take it for granted the air is safe because candles continue to burn, but *always* regard it as an urgent danger signal if candles burn low or go out. If this happens, rescuers should at once withdraw, and wait until the place has been more thoroughly blown out, unless rescue can be effected immediately and easily.

4. The next thing to do is to bring the affected man as quickly as possible to the nearest place where the air is fresh, and then *at once to attend to the breathing.* To bring the man to the surface before commencing treatment will in bad cases give that treatment little chance of success, and in cases where artificial respiration is required the delay will render treatment hopeless. Yet this sort of thing still happens.

The routine first-aid treatment recommended is as follows :—

1. In slight cases, where the man is conscious and quite able to swallow, the usual treatment is to give a dose of **Emetic** (copper or zinc sulphate are commonly employed), and when that has acted, to follow with a dose of **Sal Volatile.**

There is no doubt that effectual vomiting gives great relief, and is a valuable safeguard against after-effects, particularly in nitrous-fumes poisoning.

2. In all cases of carbon-monoxide poisoning of any severity, **Oxygen** should be administered.

3. When the man is unconscious, oxygen should invariably be given, and persevered with until consciousness is restored. When breathing is obviously failing, **Artificial Respiration** must be employed as well. Either Sylvester's or Schäfer's method may be used. The former is commonly more convenient on the wet and uneven surfaces of mine ground, but the latter is rather more effectual, and should be used when circumstances permit. In desperate cases, where breathing has ceased, the use of artificial respiration may sometimes be possible on the spot where the man is first found, *provided that the place has first been well blown out.* To do so requires courage and judgment, but it has saved life in at least one case within Irvine's knowledge.

4. The man must be kept warm throughout by extra covering, friction of the limbs, etc. He must not be allowed to exert himself too soon, since in carbon-monoxide poisoning exertion may readily cause a dangerous exaggeration of the condition. On no account, even in

comparatively slight cases, should the affected man be allowed to walk home. Hot strong **Coffee** should be given, and alcohol avoided.

5. All cases of carbon-monoxide poisoning of any severity should be sent to hospital, and this rule should invariably be followed where the circumstances suggest that nitrous-fumes poisoning may have occurred. It is most important to keep these cases under observation, since the danger of acute symptoms setting in after apparent temporary recovery is always present.

Medical Treatment.—In the early stage, first produce **Emesis** as soon as possible. Follow this by stimulant, **Ammonia** or (preferably) **Pituitrin.** Then send the case straight to hospital. **Atropine** may prove useful in the latent stage.

In the acute stage with developing œdema of the lungs, the first step is **Wet Cupping** of the chest, back, and front. This invariably relieves the symptomatic distress. It should be followed locally by poulticing or, better, by **Jacket Mustard-water Fomentation,** applied very hot and changed every hour.

In all recognized cases of acute œdema, **Free Blood-letting** should next be performed. This is a most valuable remedial measure. The condition of the blood may render bleeding difficult, but it should be free (12 to 20 oz.). *Venesection should not be delayed until the condition becomes grave.* It should be undertaken immediately on the recognition of the nature of the case. Follow venesection by saline infusion, and repeat this if necessary. Administer **Oxygen** intermittently to relieve and tide over the asphyxial condition. Give **Ammonia** in repeated doses. Injections of **Pituitrin** (1 c.c.) repeated every four hours should be tried.

Dr. Irvine had written the above notes before he had an opportunity of seeing the very valuable report by Lieutenant Elliot Black, Glenny, and McNee, on "Cases of Poisoning by Noxious Gases used by the Enemy" (*see* Medical Annual, 1917, p. 241). The number of cases covered by this report is much greater than that on which his local experience is based. It is especially interesting, therefore, to observe that the method of treatment evolved by experience has been in each case identical. Acute œdema of the lungs is the condition to be combated in the field hospitals just as it is in the mines.

Reference.—[1]*Med. Jour. of S. Africa,* 1915, Sept.

GASTRIC ULCER. (*See* Stomach.)

GENERAL PARALYSIS OF THE INSANE. (*See also* Syphilis of the Nervous System.)

Bedford Pierce, M.D., F.R.C.P.
Kate Haslam, M.D.

There continues to be some difference of opinion as to the value of the various modern methods of treatment (these were discussed in the Medical Annual, 1917, p. 246).

Dunton and Sargent[1] find that the duration of paresis following treatment by the **Swift-Ellis Method** is about half that of cases treated by the older methods.

Riggs and Hammes,[2] summarizing the history of recent treatment of general paralysis of the insane, conclude: (1) Both clinically and biologically it has been demonstrated that treatment is a material benefit to the paretic. (2) Before the **Salvarsan** era, the number of remissions varied from 4 to 20 per cent; since its use and the employment of modern forms of therapy, they have been greatly increased in frequency. (3) Treatment, to be effective, must be given in the earliest stage of the disease; it is useless in cases of long standing; cell destruction cannot be replaced. Also, it must be persistent.

T. E. Knowles Stansfield and F. W. Mott[3] record a case which proved fatal after the unusually short duration of six months and a few days. The blood and cerebrospinal fluid gave a strong positive Wassermann reaction during life. Macroscopic examination did not reveal any of the naked-eye appearances of brain syphilis or of general paralysis of the insane, although an emulsion of a small portion of the frontal lobe exhibited numbers of spirochætes. The case therefore confirms Lavaditi's experience that spirochætes can be found at the seat of inoculation before the chancre appears. It has been Mott's experience that spirochætes are more easily found in rapidly fatal acute cases in which macroscopic changes are not evident, or not markedly so. In advanced cases the syphilitic organisms are less easily found. They are discovered in the inflammatory cell-infiltration of lymphocytes and plasma cells of the perivascular sheaths rather than in the cortical brain substance. We can therefore understand why the cerebrospinal fluid gives a positive reaction in the earliest stages of the disease; for the perivascular sheaths form part of the irrigation system of the cerebrospinal fluid, which in all probability functions as the lymph of the brain. It is the toxins produced by the spirochætes which produce the chronic inflammatory process; consequently, the spirochætes, by virtue of the soluble toxins produced, may have a far-reaching irritative effect on the perivascular lymphatic sheaths, leading to widespread congestive stasis and neurone decay. Prior to the decay, the toxins in the perineural spaces may cause irritation and lead to increased functional activity of the neurones, and the excitement occurring in the early stages of the disease may be accounted for as intoxication effects acting more or less on the whole brain.

References.—[1]*Amer. Jour. Insan.* 1917, No. 2, 252; [2]*Jour. Amer. Med. Assoc.* 1917, i, 194; [3]*Lancet*, 1917, i, p, 335.

GOITRE. *J. S. Fraser, M.B., F.R.C.S.*

Goitre is the result of a constant call on the thyroid's activity. Such a call in a large number of cases is due to toxins. In thyrotoxic goitres of a mild type, and in pronounced Graves' disease, a septic focus often exists. Such foci are found in the tonsils, antra and other nasal sinuses, and at the roots of teeth. Pern[1] has found material benefit follow removal of a septic focus. The thyroid enlargement of pregnancy is due to the call on the gland to destroy

toxins. These cases are benefited by thyroid extract. The second function of the thyroid is vasodilatory, in which it is linked up with the sympathetic adrenalin system. Over-action of the adrenals, brought on by fright or shock, has to be met by a correspondingly large thyroid output. The third function is that of the metabolism of calcium salts. In Gippsland, goitre with mild thyrotoxic symptoms is very prevalent. This is due to the absence of lime in food and water. When treated with calcium salts a large proportion of these goitres vanish. Goitre is present in limestone-hill country, but in this type there are no thyrotoxic symptoms. The thyroid and parathyroids control calcium metabolism, and an excess of this element leads to hypertrophy. If there were more calcium in Gippsland and less in Switzerland and other parts, goitre would be less prevalent.

Reference.—[1]*Med. Jour. Austral.* 1916, June, 174.

GOITRE, EXOPHTHALMIC. *Herbert French, M.D., F.R.C.P.*

The value of **Radium** applications over the thyroid gland in the treatment of Graves's disease is emphasized by W. H. B. Aikins,[1] who records six cases in which subsidence of all the symptoms occurred after the use of radium locally when other measures had previously failed. The advantage of radium over *x* rays in this respect is that, whereas *x* rays have to be applied two or three times a week for several consecutive months, each series of radium séances lasts less than a week, and there are several weeks' intervals between successive treatments. The patient is therefore freer under the latter treatment than she is under *x* rays. The writer's own experience is certainly that radium may bring about considerable amelioration in the less severe cases of Graves's disease, but he is inclined to think that the **X Rays** are more certain than radium in their results. Aikins concludes with a very sapient paragraph which applies in all cases of Graves's disease with great force, no matter what general or local treatment they may be undergoing. He says :—

"I should like to refer briefly to the psychological aspect of the condition, and its significance in relation to treatment. In view of the fact, which is now generally accepted, that injury of some kind to the nervous system is—even if not a primary factor—at least a very important factor in the etiology of exophthalmic goitre, and that, as a rule, symptoms referable to it predominate in the clinical picture, it follows that one of the essential objects in treatment is to endeavour to relieve these nervous symptoms, and that therefore psychotherapy plays an important rôle. This being so, it is obvious that it is highly desirable that physicians who have not had much experience of neurotic and neurasthenic people, and consequently do not understand them and have no sympathy with them, should refrain from undertaking the medical treatment of cases of this kind, in which the psychic element is such an important feature."

Another writer who appreciates the value of **Psychotherapy** in

Graves's disease is Beebe.[2] He discusses the question of recurrence of the disease after thyroid operations, and points out how common such recurrences are after the surgeon has discharged the patient and included her in his list of cases cured by operation ; and he concludes : "The writer is convinced that the frequency of recurrence, together with the incomplete relief afforded in a large percentage of cases, demands that the patient have the benefit of something more than the simple ligation of the blood supply, or a partial extirpation of the gland, in order to produce a final and permanent condition of good health. The surgeon, as a rule, does not have the experience, the time, or the attitude toward the problem of medical treatment that is characteristic of the physician. Evidence is not wanting that with increasing experience many surgeons appreciate, in a way they did not in the beginning of their thyroid work, the necessity for medical supervision and direction of the patient following operation ; but the writer is convinced that the interests of the patient in dealing with so intricate and complex a problem will best be served by the co-operation of a physician and surgeon who have a sufficient amount of respect for each other's integrity and ability to enable them to work in harmony in deciding the course to be followed in any given case."

It is quite certain that the personality of the patient's doctor, and the keenness he evinces in his methods, have much to do with the curative effects of the latter, for whatever the thyroid pathology of Graves's disease, the nervous and psychic elements in the disease (whether these be primary or secondary) are of very great importance in connection with the treatment of individual patients.

Numerous articles upon the value of **X Rays** applied locally over the thyroid gland in the treatment of Graves's disease continue to appear. All writers on the subject of *x*-ray treatment of hyperthyroidism have come to the following conclusion : The pulse-rate is nearly always reduced, and this almost always at once. The tremor and nervous symptoms improve from the start. The gland rapidly diminishes in size in some cases, remains unaffected in others, but if it is hard, tense, and throbbing, the throbbing diminishes, and the gland becomes softer. The body weight practically always immediately increases. The advantages of this treatment are : (1) There are no fatalities ; (2) There is no resulting scar, as after operation ; (3) It does not interfere with the patient's occupation ; (4) It is painless, and causes the patient very little inconvenience : (5) If unsuccessful, an operation may be done with less risk, because of the favourable action of the *x* rays on the thymus gland. The *x*-ray treatment of Graves's disease should not be undertaken except by those thoroughly experienced in Röntgen therapy. The dosage must be accurately measured, for if the rays are applied in a haphazard manner, without knowledge of the total dosage, the result may be unsatisfactory, resulting in serious burns or in total destruction of the gland, causing myxœdema.

M. Seymour[3] advocates the following method of using the *x* rays, which differs from that generally in vogue in that longer intervals of freedom from treatment are allowed : The neck is divided into three areas—right, left, and middle or suprasternal—and the treatment directed to these areas. A Coolidge tube is used. The average dosage should amount to about 4 H, which equals 5 Holzknecht or 10x Kienbock or 1 B Sabouraud-Noire. This is the dose necessary to produce a slight erythema. Some writers state that an erythema dose is too severe, but Seymour has not found this to be so. It seems advisable, however, to keep just below the erythema dose, so as not to cause any skin irritation. In all cases the target of the tube was at a distance of 10 in. from the skin, and a filter of 4 mm. of aluminium and one thickness of sole leather was interposed. The dose was not repeated inside of three or four weeks. Under general treatment, most of the patients did not change their modes of living, except the diet, which was increased or favourably rearranged ; and treatment was directed towards anæmia, which was present in a considerable number of cases.

Seymour had under treatment, at the Massachusetts General Hospital, 144 cases of Graves's disease. Treatment of most of these cases had been going on since August 1, 1915. Of these 144 cases, 80 had been given at least two treatments. The average number received had been four. The duration of the treatments had been from two to eight months, the average being three and one half months. Of the 80 cases which had been treated, all but 7 showed improvement. Of these 7 cases, 3 had received two treatments, 3 three treatments, and 1 four treatments. In one of these cases the disease was complicated by asthma, and one had active pulmonary tuberculosis. Five cases showed no change. In four (born in Russia), although the pulse-rate was lowered and the tremor had largely disappeared, they would not admit that they were improved, and complained of indefinite aches and pains throughout the body. One had had three treatments and showed absolutely no change. Of the 80 cases, 8 were absolutely cured of their symptoms. Nearly all had gained in weight. The average gain was 7 lb., one case having gained 25 lb. The pulse-rate was lowered in all but a few cases, the average being twelve beats. The greatest lowering in pulse-rate was 52 beats, from 146 to 94. In this patient the symptoms were very severe, with marked exophthalmos and tremor, and a moderately enlarged tumour of the gland. She had five treatments. The tremor disappeared, the exophthalmos had practically gone, the circumference of the neck decreased $\frac{1}{2}$ in., and she felt perfectly well.

Hector Mackenzie[4] devotes his Bradshaw Lecture to Graves's disease, and the original should be consulted for many details for which there is too little space here. His experiences with the **X-ray** treatment merit particular notice, however, for from being sceptical as to their advantage he is a strong convert since he actually watched a case of Graves's disease being converted by *x*-ray treatment into a case of myxœdema ; the latter being then kept in control by the

administration of thyroid extract. If this result could be effected in all cases of Graves's disease it would probably be the surest method of curing the patient completely. He says: "The following case is of great importance and interest, showing as it does that a case of exophthalmic goitre can be converted by means of *x* rays into a case of myxœdema, and then by means of thyroid treatment can be restored to a normal state. The total number of treatments in this case amounted to 36, and extended over a period of four years. It seems to me that a possible reason why *x*-ray treatment has not hitherto yielded better and more convincing results is that it has not been persevered with sufficiently long. In many cases the treatment has been given up after a comparatively short course because no very obvious improvement had taken place.

"The patient, age 23, came under treatment in March, 1912. For eighteen months she had had enlargement of the thyroid, and for fourteen months exophthalmos. On admission to the hospital the thyroid gland was uniformly and considerably enlarged, the circumference of the neck being 14⅞ in. There was a moderate degree of exophthalmos. The pulse-rate varied between 104 and 136. The blood-pressure was 156 mm. and the blood-picture was typical. There was well-marked tremor. She left at the end of June with general improvement. The enlargement of the thyroid was considerably diminished, the neck measuring 2⅜ in. less in circumference than it did on admission. She had one application of *x* rays in June before she left. After leaving the hospital she gained a stone in weight, but her thyroid enlarged again, and at the beginning of November her neck had increased 1½ in. Her pulse-rate continued rapid, 120 to 140. In November and December, 1912, and in January and February, 1913, she had nine applications of *x* rays without any diminution in the size of the thyroid, which, if anything, got a little larger. Up to the beginning of February she was increasing in weight, and then she was 25 lb. more than when she left the hospital. During the next four months she lost weight steadily to the amount of 18 lb. She remained in about the same condition until March, 1914, but her general health was fairly good and she was able to be at her work. In March, 1914, she resumed *x*-ray treatment, and I lost sight of her for a time. She then weighd 9 st. 12 lb. She had *x*-ray treatment on the following dates during 1914: March 9, 16, 23; April 20; May 11, 18, 25; June 8, 22, 29; July 20; Aug. 10, 24; Sept. 7; Oct. 19; Nov. 16, 30; and Dec. 29—18 applications in all. During 1915 she had treatment on Jan. 26, March 23, April 29, June 8, July 6, Aug. 9, Oct. 12, and Nov. 9—8 applications.

"The patient returned to see me in March, 1916, with the typical appearance of myxœdema. She stated that she had been getting stouter for about six months. Her face had become puffy, her legs thick, and her hands large. She had felt the cold very much during the winter, and her limbs were scarcely ever warm. Her hair was very dry and was coming out very much. Her voice was getting very thick and hoarse, and her speech was slow and monotonous. Her pulse was 80, and her weight 10 st. 12 lb. No thyroid enlargement could be made out. She was put on thyroid tablets, 1 gr. (representing 6 gr. of gland) twice a day. In two months all signs of myxœdema had disappeared, and her weight reduced to 9 st. 6 lb. She continued the thyroid tablets, and when seen in July, 1916, the only remaining sign of exophthalmic goitre was that the eyes were very slightly prominent, but neither Stellwag's nor von Graefe's sign was present. There was no thyroid enlargement. Her heart was going quietly at the rate of 72. She was doing her work as a general servant, and was quite equal for it. I saw her again on October 24, 1916, and her condition remained normal except that she had to continue the thyroid tablets. Her blood-picture was then quite normal.

"I have never before seen such a complete disappearance of the signs and symptoms of well-marked exophthalmic goitre as has taken place in the above case. I think one is justified in ascribing the cure to the prolonged *x*-ray treatment.

"My present views on *x*-ray treatment are: It may prove to be far the best means of treatment at our command. It must be applied in no half-hearted way. It must be persevered with, and in many cases continued for a long period. It is most likely to prove beneficial in cases where the thyroid enlargement is moderate and the patient is not so seriously ill as to necessitate confinement to bed. I think it may prove valuable in bringing about a retrogression of the remaining thyroid after a hemithyroidectomy. I have not at present sufficient evidence to speak of its usefulness where the goitre is a very large one. It has seemed to fail, as other remedies do, in cases of a severe type and rapid course. The trend of present experience in respect of *x*-ray treatment is decidedly in favour of its further trial."

Fischer[5] remarks that röntgenotherapy seems to be far more effectual than all other measures combined, with the exception of the operative, in treatment of exophthalmic goitre. Bruno-Glaserfeld's compilation of 2032 cases in which thyroidectomy was done, shows 82 per cent materially improved or permanently cured. Fischer has compiled similar statistics showing 80 per cent cured or improved, but the figures are too small for comparison. At the same time, röntgenotherapy is comparatively harmless, while operative measures show a mortality of 54 per cent in Bruno-Glaserfeld's compilation, and 6 per cent in Hildebrand's compilation from the Kocher, Riedel, Klemm, and Schulze clinics.

Fischer has treated with röntgen exposures 94 exophthalmic goitre patients in his private clinic, and 37 with simple goitre. The ages ranged from fourteen to sixty-seven; 8 were under eighteen and 9 over fifty. Only 2 of the 94 in the Basedow group were men. Fully 20 per cent in this group were unable to be out of bed except as they came for treatment. The affection was of from one to four years' standing as a rule. Positive benefit was obtained in from 77 to 80 per cent of the cases, while no improvement was evident in the others. Two of the patients claimed that they felt worse after the course of treatment, but one of these was found a few months later to have much improved. A complete subsidence of all objective and subjective signs and symptoms of the exophthalmic goitre was realized in 15 cases. In the other improved cases some of the symptoms subsided, while others persisted. The thyroid subsided to normal size in 22, and in fully two-thirds of the cases it became much reduced in size. The exophthalmos was the most refractory symptom, yielding most slowly to treatment, if at all, It was present in 49 of the cases, and subsided completely in the course of a year in 5, and was much improved in 18, but it never retrogressed completely when excessively pronounced. Fischer gives a good historical review of the application of the *x* rays in treatment of exophthalmic goitre. He usually gave

ten sittings, and then waited three months before resuming them, the entire course taking from six to twelve months. The therapeutic effect is never so prompt as after operative measures. He thinks a trial is justified even in the operable cases.

Graves's Disease and the War.—Léon Bérard[6] states that since the beginning of the war he has met with a relatively large number of cases of exophthalmic goitre in men from twenty to forty-five years of age. Some of these subjects had previously had small stationary goitres for a more or less prolonged period. The exophthalmic symptoms developed from physical or mental overwork, intoxication from poor food or water, or microbic infections—dysentery, typhoid, or paratyphoid—in the form of light attacks of thyroiditis. In three cases, however, exophthalmic goitre appeared suddenly, following violent emotions, repeated anxiety, or strenuous physical exertions. In a few days these three subjects found their necks growing larger, eyes protruding, pulse-rate increasing, and their mental state exhibiting restlessness and anxiety. All three had diarrhœa, and lost considerable weight. Nervous shock, manifested essentially in vasomotor disturbances and transient or permanent changes in the ductless glands and central nerve cells, is held to be the starting-point of such cases. The therapeutic indications in all varieties, whether due to fatigue, mental shock, or infections attending war, include prompt **Isolation** of the patient in calm and comfortable quarters, where he may feel himself completely safe. (*See also* X-RAY AND RADIUM THERAPY, p. 54.)

REFERENCES.—[1]*Canad. Pract. and Rev.* 1916, Aug., 323; [2]*Med. Rec.* 1917, i, 627; [3]*Boston Med. and Surg. Jour.* 1916, ii, 551; [4]*Lancet*, 1916, ii, 815; [5]*Jour. Amer. Med. Assoc.* 1916, ii, 1706; [6]*Bull. de l'Acad. de Méd.* 1916, Nov. 28.

W. I. de C. Wheeler, F.R.C.S.I.

Crile,[1] referring to cases of exophthalmic goitre, states that these hypersensitive patients may be killed by fear—even by worry,—by light infection, by moderate work, by slight injury, or by surgical anæsthesia. He urges the use of local anæsthesia, feather-edged dissection, and the gentlest of handling during the operative treatment. In the bad cases the operating room goes to the patient, and ligation or lobectomy is done in bed. In serious cases the wound is left open, and closed after twenty-four hours.

The same author[2] summarizes the surgical treatment, based on the results of 674 operations performed by himself and his associates, as follows: (1) A period in which non-surgical treatment has been tried. If this has been done without avail, then (2) Surgical procedures to break the force of the disease are indicated; and (3) A period in which the greatest possible degree of restoration for those organs which may have been damaged by the disease is accomplished by rest, and by dietetic and hygienic management.

Quervain[3] recommends the ligation of the most important arteries before doing anything whatever to the goitre. The inferior thyroid artery is secured first. The sternomastoid muscle is exposed through

the usual collar incision, and retracted outwards. A vertical incision is then made in the fascia of the small muscles. The carotid artery is defined, and the inferior thyroid artery comes into view on the deep aspect of the main vessel. To catch the superior thyroid artery, a short transverse cut is made in the line of the skin folds at a level with the thyroid cartilage. This ligature should also be applied before luxation of the goitre.

Thyroid Abscess.—Lahey[1] describes two prominent signs of this condition: (1) Limitation of chin elevation; and (2) Depression of the chin on the sternum when swallowing.

References.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 610: [2]*Ohio State Med. Jour.* 1917, Jan. (abstr. in *N. Y. Med Jour.* 1917, i, 135); [3]*Surg. Gyn. and Obst.* 1916, 402; [4]*Boston Med. and Surg. Jour.* 1917, i, 94.

GONORRHŒA. *C. F. Marshall, M.D., F.R.C.S.*

MacMunn[1] points out that gonococci are damaged by cold and heat, by alkalies and acids. In acute gonorrhœal urethritis he recommends for *abortive treatment* either: (1) Cold injections of **Silver Preparations** retained for twelve minutes by means of a clip to close the meatus; (2) Hot irrigations of **Potassium Permanganate** increased daily from 1–8000 up to 1–800. He states that the urethra will bear a temperature of 115°, while the gonococci are killed by a temperature of 113°. He considers that the value of irrigation is due more to distention than to flushing. Before irrigation of the posterior urethra he gives a rectal injection of **Morphia** gr. $\frac{1}{4}$, **Atropine** gr. $\frac{1}{60}$, **Phenazone** gr. 10, to prevent pain and peristalsis of the vas deferens. If gonococci are present after twelve days' irrigation, the solution should be changed to 1–5000 to 1–2500 **Silver Nitrate.** In mixed infection of the urethra, **Mercurial Salts** are to be preferred.

In the instrumental investigation of the cause of *chronic urethritis*, the author recommends acorn-headed bougies, sounds, and an automatic urethrometer, in preference to the urethroscope, which fails to detect such a condition as stricture behind stricture. He mentions that sounds can dilate the wider parts of the urethra beyond their size if they are used as levers. A very narrow meatus should be incised before instrumental treatment. After dilatation, injections or lavage with **Silver Nitrate** 1–2000 to 1–1000 should be used if gonococci are present; later on, astringents. For prostatic and vesicular complications, massage, followed by cold rectal douches, is indicated, and a mixture of **Ichthyol, Iodine,** and **Glycerin** is injected and worked into the tissues by a bougie. A solution of **Silver Nitrate** in glycerin may also be used. The author does not advise the use of Kollman's dilators, as they stretch the wide parts (bulb) at the expense of overstretching the narrower parts. Infiltrations and infected glands and follicles are better treated with sounds, by means of which internal massage and dilatation of the urethra can be effected. Infected glands and ducts may be emptied by an aspirator attached to a large tube with a long slot. By this apparatus alternate suction and

injection can be practised, especially on the prostatic ducts. If this fails, **Ionization** may be tried. In the author's opinion urethroscopic treatment is only required in about one-third of cases of chronic urethritis. In some cases of prostatic infection all these measures fail; the author then advises injection of the gland with **Collosol Argentum,** by means of a hollow needle mounted on a silver tube longer than the endoscopic tube through which it is used. The needle is pushed into the prostatic sinus on each side of the verumontanum, and the solution injected by means of a syringe. In vesicular gleet, massage often fails; in this case the author recommends aspiration and injection of **Colloid Silver.** Guided by a finger in the rectum, a long fine needle is passed through the ischiorectal space, to one side of and above the anus.

Russ[2] reports the results of the treatment of 100 cases of gonorrhœa by his method of **Electrolysis** (*see* MEDICAL ANNUAL, 1916, p. 291). One advantage of this method is that the treatment is entirely in the hands of the surgeon. The series consisted of 69 acute and 31 chronic cases. The average number of treatments in the acute cases was 16 (minimum 5, maximum 34); in the chronic cases 20 (minimum 14, maximum 35). The duration of disease in chronic cases was from fourteen days to five years before commencing electrolysis. Complications were one case of arthritis and four of epididymitis. In chronic cases in which pus and gonococci are found in the discharge, electrolysis is, in the author's opinion, the best treatment; but if there be little pus, no gonococci, and a predominence of epithelial cells, electrolysis should be avoided. In such cases an **Autogenous Vaccine** made from the secondary bacteria present (staphylococci, colon or diphtheroid bacilli) should be given weekly in gradually increasing doses. **Urotropine, Salol,** or **Santal Oil** should be given internally, and lavage and instrumentation abandoned. Diuresis should be avoided, so as to give the urethra rest. In cases of stricture with a discharge containing pus and gonococci, electrolysis should be applied carefully with a small current. A complication may occur owing to spasmodic contraction on the catheter. This may be overcome by reversing the current, or by injecting **Stovaine.** The author recommends that when acute gonorrhœa fails to be cured by the usual methods, recourse should be had to electrolysis.

Recently, Russ[3] has used a new electrolyte instead of the sodium iodide and iodine solution previously employed. The new solution consists of **Sodium Chloride** 1 per cent and **Monochloracetic Acid** ½ per cent. Its use is based on the fact that during electrolysis of a sodium salt (sodium iodide), iodine is liberated at the positive and sodium at the negative electrode, which is represented by the mucous membrane. The amount of alkali thus formed increases with the strength and time of the current. This alkali-formation is undesirable, as the normal urethra is never alkaline. Hitherto the free iodine in the mixture was used to neutralize this alkalinity, but was insufficient. The mixture of sodium chloride and monochlor-

acetic acid causes only slight and transient alkalinity with a current of 3 ma. Monochloracetic acid, being of high electrical resistance, remains as a free acid which neutralizes the sodium. With this fluid, acute cases seldom require more than twelve sittings—six in the first week, and three in the second and third weeks. The technique is the same as before, the stylet within the catheter being the positive, and the pad the negative electrode, the current being 2 or 3 ma. With the new fluid no reversal of the current is necessary. The author repeats that the principles of his method of electrolysis are: (1) To assist the natural process of phagocytosis and discharge of gonococci by means of the leucocytes, especially from the urethral glands and follicles, which are inaccessible to injections; (2) To avoid the waste of antibodies by unnecessary lavage or other dilution by excessive fluid, through which the supply of these valuable substances to the affected parts may be hindered. He concludes that electrolysis is the most rapid local treatment of gonorrhœa, and that if cases are treated early it is rare for infection to reach the posterior urethra.

Culver[4] has compared the results obtained by the intravenous injection of **Meningococci** and **Colon Bacilli** with those following a similar injection of killed gonococci, with a view to test the specificity of the latter as a therapeutic and diagnostic agent. One series of patients suffering from gonorrhœa and some complications, such as arthritis, epididymitis, or prostatitis, was treated intravenously with a strongly reacting dose of gonococcal vaccine, another series with a similar dose of meningococci, and a third series with colon bacillus vaccine. Twenty-four cases of gonorrhœal arthritis were treated: eleven with gonococcal vaccine; eleven with meningococcal, and two with colon bacillus vaccine; all but two recovered or greatly improved. Similarly, in acute gonorrhœal epididymitis, there was no difference in the results obtained by the three vaccines, all cases recovering in a week. He concludes that the **Intravenous Injection of Gonococcal Vaccine** has no specific action either as a diagnostic or therapeutic agent: that similar reactions are produced in non-gonorrhœal cases; that the treatment is of therapeutic value, but has no prophylactic action against the development of any fresh complications; that organic heart disease is a contra-indication; that the benefit to the patient is proportional to the fever and hyperleucocytosis produced.

Lumb[5] reports successful results from **Vaccine Treatment** in *acute* gonorrhœa. The main point in the treatment consists in the administration, at frequent intervals, of large doses of a mixed stock vaccine containing 50 million gonococci and 150 million staphylococci per c.c. On the first day 1 c.c. of this stock vaccine was given; on the third, sixth, ninth, twelfth, and fifteenth days, 2 c.c. After an interval of ten days a second course of injections of 2 c.c. was commenced, with two days' intervals between the injections. Many cases required one course only, others two, especially those with complications. In addition to vaccines, weak irrigations of **Potassium Permanganate** (1–8000) were given twice

daily, replaced by 1–1000 **Zinc Sulphate** or 1–4000 **Zinc Permanganate** for a few days after the fifteenth day. **Urotropine** and **Acid Sodium Phosphate** were given for the first five days. On the ninth day a bougie was passed and the urethra massaged. When the urine was free from flakes the irrigation was stopped, and after two or three days a provocative dose of 100 million gonococci was given. This shows signs in the urine within twenty-four hours. For the first three days the patient was kept in bed on milk diet : the latter was gradually increased, and towards the end of the first course he was on full diet and exercise. The 500 cases treated consisted of 278 uncomplicated and 222 complicated ; the average duration of treatment in the former was thirty-five days, of the latter fifty-two days. There were only two relapses in four to six months.

On the employment of **Colloidal Sulphur,** *see* p. 31.

References.—[1]*Pract.* 1917, Oct., 373 : [2]*Ibid.* 1916, Sept., 266 ; *Lancet*, 1916, i, 977 ; [3]*Brit. Med. Jour.* 1917, i, 616 ; [4]*Jour. Amer. Med. Assoc.* 1917, i, 362 ; [5]*Brit. Med. Jour.* 1917, ii, 450.

GRANULOMA OF LIP. (*See*-Lip, Non-infective Granuloma of.)

GRANULOMA PUDENDUM. *Sir Leonard Rogers, M.D., F.R.C.P.*

D. Florence Curjel[1] records an extensive experience of this disease in female patients treated at the Dufferin Hospital at Simla. The people regard the disease as a venereal infection, and the histories of the cases supported this view. The ages of the patients varied from 16 to 45, and averaged 25 years. The general condition was usually good, inflammation of the affected parts generally bringing them to hospital. The edges of the ulcers showed an infiltrated thickening of the skin, and the ulceration tended to spread rapidly, apparently due to lack of cleanliness. The infected women were usually sterile. After some days spent in cleansing the ulcers with permanganate and other antiseptics, **Excision,** with **Scraping** of the affected parts under chloroform, was undertaken, as these female patients were not willing to submit to *x*-ray treatment, except one, who improved under it. A sharp curette was used for removing the nodules at the spreading edge of the ulcers. Rapid and satisfactory healing was generally obtained. The main peculiarities of the disease in females are the presence of a heavy vaginal discharge, while the crura of the clitoris are early and characteristically involved, and the inguinal glands are also enlarged.

G. C. Low and H. B. Newham[2] record a case of ulcerating granuloma which was refractory to intravenous injections of antimony, *x* rays, and other treatment.

References.—[1]*Ind. Med. Gaz.* 1917, Sept., 305 ; [2]*Trans. Soc. Trop. Med. and Hyg.* 1917, April, 109.

GRANULOMA PYOGENICUM. *E. Graham Little, M.D., F.R.C.P.*

Montgomery and Culver[1] suggest a connection between the development of granuloma pyogenicum and a high blood-pressure, having found the association present in three out of five cases which they

report in full. The causation of granuloma pyogenicum has been much disputed, the preponderating opinion at the moment ascribing the development of the small mass of granulation tissue which composes the tumour to sepsis, as the name adopted would imply. The authors suggest the greater probability of a traumatic dilatation of a blood-vessel as the initial cause, and high blood-pressure would contribute to this. Probably also some of the mass of the swelling owes its origin to organization and vascularization of the primary blood-clot. The characteristic lesion is a globular, red, easily-bleeding tumour, the size of a pinhead, a pea, or a hazel nut, with an eroded top or a top capped by a blood-crust. It is seated on the flat surface of the skin or mucous membrane, or in a cup-shaped depression, and it is either constricted at the base or has a well-marked pedicle. This feature may have to be demonstrated by running a probe around it.

The treatment consists of **Ablation,** and the obliteration of the supplying blood-vessel. In some cases this is best done by cutting out a lozenge-shaped piece of skin, including the base of the pedicle. In other cases the cut stump may be curetted and then cauterized deeply. In any case the object is to attack the blood-vessel of supply below the point where it is affected.

Reference.—[1]*Jour. Cutan. Dis.* 1917, May–June, 338.

GRAVES'S DISEASE. (*See* Goitre, Exophthalmic.)

GUMS, PIGMENTATION OF. *W. H. Dolamore, M.R.C.S., L.D.S.*

In pre-war days, pigmentation of the gums, unless associated with sarcomatous growths or purpuric conditions, was due to one of two causes, lead poisoning or the use of charcoal tooth-powders. The history of the case gave a clear indication. In the latter group the tattooing of the gum by the carbon particles was only effected where the tooth-brush commonly reached, i.e., on the labial surface and round the anterior teeth: though in the case of a Belgian soldier, recently seen, it extended backwards to the second molar region, but there it was more faintly marked than in the front of the mouth. On the lingual surface it is absent. The teeth are commonly clean and frequently good, for the patient is often somewhat of an epicure in tooth-powders, and the gums are otherwise healthy. In lead poisoning, apart from other symptoms, the teeth are usually dirty, often markedly so, and commonly loose. The gums are generally swollen and inflamed, and the breath is foul. The pigmentation is as marked—perhaps more so—on the lingual surface as on the labial. Since the war, pigmentation is seen which is associated with the application of *bismuth paste* to open wounds. In the three cases seen by the writer it did not appear to have produced any other ill effect. Two officers complained that soon after their injury and the application of the paste the gums were much swollen, and that they had lost the sense of taste, though naturally the latter may have been due to other causes. The pigmentation seems to fade away gradually, and pro-

duce no inconvenience: how long it may persist it seems premature to decide. The presence of tartar seems to increase the marginal swelling of the gums, and when viewed by transmitted light, as reflected by the mouth mirror, the pigmentation is a clearer, more translucent blue than in either of the other conditions. In one case—amputation of both lower extremities—pigmented patches were also present on the mucous membrane of the cheek. In these cases there were no other symptoms of bismuth poisoning such as have been described, especially recently.

GUNSHOT WOUNDS. (*See* WOUNDS, ETC.)

GUNSHOT WOUNDS OF CHEST. (*See* CHEST, WOUNDS OF.)

GUNSHOT WOUNDS OF JAWS AND FACE. (*See* JAWS AND FACE.)

GUNSHOT WOUNDS OF NERVES. (*See* NERVES.)

GUNSHOT WOUNDS OF THE SKULL. (*See* SKULL.)

HÆMOLYTIC JAUNDICE. (*See* JAUNDICE, HÆMOLYTIC.)

HÆMORRHAGE.

Ill effects following severe bleeding combated by the use of **Acacia-Locke** solution (p. 1): **Blood Transfusion** in hæmorrhagic diseases (p. 6).

HÆMORRHAGIC DISEASE OF THE NEW-BORN.

Frederick Langmead, M.D., F.R.C.P.

In recent years many successful cases have been recorded of patients treated by human blood serum and by transfusion. Bethel Solomons[1] records a severe case treated by **Horse Serum, Calcium Lactate,** and **Adrenalin.** Serious hæmatemesis and melæna began twenty-one and a half hours after birth, and were repeated. The baby appeared to be in pain and became collapsed. At first 2 c.c., and later 6 c.c., of horse serum were injected into the loin, and four doses of a mixture containing calcium lactate (1 gr.) and adrenalin hydrochloride (1 min. of 1–1000) were administered orally. Five c.c. of the serum and twelve doses of the mixture were given on each of the following two days. Thereafter the serum was continued in the same dosage, also the mixture, though with diminishing frequency. The first food given was albumen-water, six days after the commencement of the illness and seven days after birth. This was reinforced by whey, and afterwards replaced by breast-feeding. The baby gradually improved after the sixth day of the illness, and finally recovered.

REFERENCE.—[1]*Boston Med. and Surg. Jour.* 1917, i, 763.

HÆMORRHOIDS. (*See* RECTAL SURGERY.)

HÆMOTHORAX. (*See* Chest, Wounds of.)

HAIR, SUPERFLUOUS. (*See* Hypertrichosis.)

HALLUX VALGUS. (*See* Joints, Surgery of.)

HEAD, GUNSHOT WOUNDS OF. (*See* Skull.)

HEART AND BLOOD-VESSELS, SURGERY OF.

W. I. de C. Wheeler, F.R.C.S.I.

Some interesting accounts have been given of *heart suture* and removal of bullets from the ventricles. Fraser[1] quoted two instances of death resulting from small penetrating wounds of the heart six or eight hours after injury. The post-mortem suggested that the cases would have proved perfectly suitable for suture. A third case was successfully operated upon. There was a small wound immediately internal to the left nipple which was oozing rather dark blood. The general condition was fair, the pulse noticeably irregular. From the centre of the sternum an incision was made along the sixth costal cartilages and rib; the cartilage and an inch of rib were removed; the fifth cartilage was divided at the junction with the sternum; a flap of chest wall was retracted upwards and to the left: the internal mammary artery was ligatured. The anterior wall of the pericardium was exposed and a perforation identified. The pericardial cavity was opened and extravasated blood removed. Immediately above the septum in the anterior wall of the right auricle there was a small valvular perforation measuring about $\frac{1}{8}$ in. With a needle-holder and a small fully-curved needle a stitch was passed through the auricle wall, and by traction this stitch brought the perforation to the surface; the hole was closed with a couple of mattress sutures. The foreign body was not seen. The pericardium was partly closed with interrupted sutures, and drained by a small rubber tube. The patient made a good recovery.

Migration of Projectile through Heart and Veins.[2]—A shrapnel ball entered at the shoulder, and its course was traced by radioscopy as it entered and lingered in the right auricle and passed thence into the inferior vena cava and the femoral vein, finally lodging in the hypogastric vein, all without inducing any appreciable symptoms. The practical lesson from the case is that it may be possible to learn the manipulations that would expel a projectile from the heart, and thus facilitate its removal by a minor operation, instead of incising the heart itself. In this case the vein was so difficult to reach and suture that the ball was left in it, with merely a ligature thrown around it to prevent further migration of the projectile.

In another case an American surgeon in France reported the migration of a fragment of shell from the femoral vein to the right ventricle. The condition remained unsuspected until the autopsy. The story has been capped by Dr. Specht, surgeon to a German military hospital,[3] who found a shell fragment in the *left* ventricle at the

autopsy on a man who died of sepsis after a deep wound of the thigh. In this case the foramen ovale was widely open, and the fragment must have passed through the aperture to the position beneath the flap of the mitral valve where it was found. The man lived ten days after his injury, but no symptom whatever had pointed to any involvement of the heart. Dr. A. R. Jaffé, assistant surgeon at the same hospital, relates a series of interesting cases from German literature, of which the most remarkable was recorded by Freund and Caspersohn, who removed from the lumen of the right ventricle a shrapnel ball 13 mm. in diameter. In this case, although the wound was situated at the edge of the right costal arch in the nipple line, and the projectile might thus have entered the right ventricle directly, the surgeons found no sign of wound of the heart wall nor effusion into the pericardium, and concluded that the ball had entered the vena cava, thus reaching the ventricle indirectly. As the patient recovered, no opportunity offered for verification of this assumption. Jaffé adds a case observed by himself, in which a Russian rifle bullet, wounding the pelvis near the posterior spine of the ilium, entered the inferior vena cava and was carried thence to the right ventricle, where it was found at the autopsy lying beneath a flap of the tricuspid valve. No thrombus was present, but the endocardium and valve were swollen and blood-stained. In this case the patient had complained during life of pain over the heart.

The writer (W. I. de C. W.) removed a shrapnel ball lying on the apex of the heart in an officer suffering from dyspnœa and palpitation. The ball entered to the left of the nipple line between the fifth and sixth ribs; it appeared attached to the apex by a fold of pericardium rather than embedded in the substance. There was no difficulty whatever in the extraction of the ball. The *Lancet*[4] refers to a case of Professor Gaudaier, of Lille. The bullet lay transversely near the apex of the heart, and followed all the movements of the left ventricle. The third and fourth left costal cartilages were exposed and divided, the pleura was incised, and the flap turned outwards by an assistant; the pericardium was incised, and the heart was seized in the left hand and brought outside the pericardium. The bullet was found embedded in the left ventricle, and removed.

V. Ascoli[5] records a case in which a projectile found its way into the inferior vena cava from the right auricle of the heart. He states that projectiles may reach the cavity of the heart either by traversing the myocardium or indirectly by one of the great veins. In the case mentioned he was able, by *x*-ray examination, to follow the course of the foreign body. The man had been under observation for eleven months at the time of writing.

Gregory[6] records a case of a shrapnel ball which entered the body between two ribs and was removed from the common iliac vein. The bullet was at first located in the chest, and subsequent *x*-ray examination showed it in the abdomen. Pain and swelling in the right iliac fossa led to operation and the discovery of the bullet in the common

iliac vein. He thinks that in the first instance the ball was in the right auricle. Lyall[7] describes the migration of a shell fragment from the right femoral vein to the right ventricle of the heart. The wounds in this case were confined to the thigh, but *x*-ray examinations were negative. At the necropsy there was a small valve-like wound, sealed by an organized clot, in the femoral vein: a rough shell fragment was found free in the cavity of the right ventricle. The following points are worthy of notice: (1) The carrying of a rough shell fragment by the blood-stream from the right femoral vein to the right ventricle, the patient living four days and eighteen hours; (2) The sealing up of the wound in the vein; (3) An *x*-ray examination of the upper abdomen might have revealed the presence of the shell fragment: it would then have been simple to milk it into an unimportant vein, whence it could have been removed easily. This has been already done in the case of a shrapnel ball.

Cowell[8] quotes a series of cases to show the beneficial result of simultaneous *ligature of the main vein* where the corresponding artery is damaged beyond repair. Makins, in his Hunterian Oration, 1917, advises simultaneous ligature of the vein in those cases where it is found necessary to tie a damaged artery. He states that the elimination in part of the capacious vein is a real advantage, since this for the time affords a too ready channel of exit for the diminished arterial supply. He also points out that the result of the combined procedure is to maintain within the limb for a longer period the smaller amount of blood supplied by the collateral arterial circulation.

Bartlett and McKittrick[9] urge the importance of ligature of the common carotid artery in cases of secondary hæmorrhage from an infected wound communicating with the cavity of the mouth. They point out that the operation is attended by a mortality of about 33 per cent, but that the repeated recurrence of secondary hæmorrhage in the region indicated is followed as a rule by a mortality of 100 per cent. The patient's chance of survival is increased many times if ligature of the common carotid is not delayed.

Sinclair[10] describes a successful case of ligature of the innominate artery for *traumatic aneurysm*. The inner end of the clavicle was resected. The innominate artery was found behind the middle of the manubrium, and ligatured with a single strand of No. 4 thirty-day catgut. Three months after operation the patient was examined and found well.

Riedal[11] recommends more conservative measures in the treatment of traumatic aneurysm. He applied continuous firm pressure to the tumour by means of a rubber sponge held in place by a bandage; the pressure was subsequently increased by means of a sand-bag. Digital compression was applied to the artery above the wound for a quarter of an hour, and gradually increased to an hour daily. By this means he effected a cure in 5 cases out of 12.

Lusk[12] describes two cases of *thoracic aneurysm* wired four years previously. He used the Moore-Corradi method. He urges the

necessity for antispecific treatment in conjunction with operation. In the first case the patient only presented himself for examination twice in two years, and the second case died four years after operation from rupture of the sac.

Wheeler[13] refers to three cases of *aneurysm of the abdominal aorta* treated by the introduction of wire into the sac. Colt's apparatus was used in each case. The first case was operated on in August, 1910; 150 in. of wire were introduced. The second case died from rupture of the aneurysm in March, 1916, when acting as a stoker on board a patrol trawler; a wisp of 105 in. of wire had been introduced six years previously. A complete post-mortem examination was made. It was found that there was a small leak, with a hæmorrhage between the layers of the mesentery. The clot forming the aneurysm, which was the size of a full-term fœtus's head, was as hard as a rock; the leakage arose from a secondary dilatation of the aorta below the main swelling. It is noteworthy that all three cases presented themselves at hospital complaining of severe pain in the back, and in none was there any erosion of the vertebræ. It is possible that the intense pain in the back common in cases of abdominal aneurysm may be due to the stretching of the highly sensitive posterior parietal peritoneum, which is also in these cases subject to a pull at every pulsation of the aorta.

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HEART, DISEASES OF. (*See also* Aneurysm, Aortic; Heart, Soldier's; Pericarditis.) *C. F. Coombs, M.D., F.R.C.P.*

Wells and Goodall[1] record two cases of syphilitic myocarditis with electrocardiographic tracings in which the second ventriculosystolic wave (the one usually labelled T in tracings) was absent at first, but returned under treatment, simultaneously with amelioration of symptoms. They suggest that this alteration of the electrocardiographic curve—absence of the T wave—may prove to be a useful sign of myocardial disease.

Pardee[2] points out the possible value of electrocardiography in the differential diagnosis between different forms of valvular disease, by the indications given by the amplitude and direction of the electrocardiographic waves of hypertrophy of the several chambers of the heart.

Crane[3] describes a new method—*Röntgenocardiography*—by which the movements of the cardiac chambers, as revealed by the *x* rays, are graphically recorded on a moving photographic plate. This plan he claims to be superior to the other methods of graphic record in vogue, since it is the only one which gives a direct picture of the

cardiac movements themselves. The method is of course a complex one and only suitable for laboratory work.

Heart-block.—White[4] records a case of transient heart-block occurring in a boy with acute rheumatism. The case is unique in that the dropping of beats, found by polygraph to be due to block, called attention to the presence of cardiac infection before there were any physical signs of the latter. In fact, there was never any other definite evidence of carditis. The boy recovered with a normal rhythm.

The length to which cardiologists are pushing the interpretation of electrocardiograms is well illustrated by the papers of Goodall,[5] and Oppenheimer and Rothschild.[6] The former enumerates the various varieties and degrees of block as follows :—

1. Generally depressed conductivity without local lesions.
2. Impairment of conductivity referable to a local lesion.
   (*a*) Auricular : (i) Slowing of the whole heart from the sinus node downwards : (ii) Sino-auricular—interference with transmission of impulses somewhere between the sinus node and the *a–v* bundle, i.e., somewhere in the auricular wall.
   (*b*) Auriculo-ventricular—partial or complete interference with the transmission of impulses from auricle to ventricle, through the *a–v* bundle.
   (*c*) Ventricular. In this class are included lesions interrupting the carriage of impulses from the main stem of the *a–v* bundle through either of its chief branches, one of which runs to each ventricle.

Oppenheimer and Rothschild go further still, and claim that certain alterations in the electrocardiographic curve may be interpreted as evidence of 'arborization block,' that is, of interference with the passage of impulses through the arborizations of the left and right branches of the main bundle. They attach a serious prognosis to this sign. If these observations are substantiated by other workers they will be of considerable import. For details as to the specific alterations in the graphic curves the original papers must be consulted.

Physical Signs.—Since the beginning of the war we have had ample proof of the truth of Mackenzie's contention, that symptoms are of more importance than are physical signs in the estimation of cardiac efficiency. This teaching has led to a re-examination of the value of the ordinary cardiac physical signs, and especially of murmurs. Thayer[7] contributes a valuable and timely paper on *deviations from the normal* met with in the examination of the heart *in apparently normal individuals.* First, he points out, that in the growing boy the heart is often disproportionately large as compared with the general physical development. This is in no sense alarming if the boy is about at puberty unless the heart is really larger than it should be in the adult. Second, he points out that the normal heart is mobile, and that, therefore, in a patient who is lying not quite

flat on his back, but with a little incline to the left, the apex beat is tilted leftwards, and gives a misleading suggestion of cardiac dilatation. Third, the common reduplication of the second sound during inspiration, a reduplication dependent on delay in the closure of the pulmonary valves, while present in a good many apparently normal individuals, may perhaps be regarded as confirmatory evidence of muscular weakness, if present throughout the cycle or in association with other signs of cardiac disease. It is a phenomenon deserving of more careful study.

Bruits de galop, according to Thayer, are of two kinds. The one, the protodiastolic, exists whenever the normal 'third sound' of the heart is audible midway through the diastolic interval. In a majority of young people this is audible, or can be made so by changes of posture. "Without other evidence of cardiac disease this may be regarded as a perfectly normal phenomenon." It is, however, often very pronounced in cases of ventricular dilatation, for example in the rheumatic heart disease of childhood. The second or presystolic type of gallop is that in which a third or adventitious sound is heard immediately before the normal first sound. This is occasionally discovered in healthy young people, especially when the heart is beating fast, but its closest association is with the cardiac hypertrophy of arterial hypertension.

Systolic murmurs at the pulmonic area are very common. Often they are increased by expiration. These have no significance. Soft short systolic bruits are often heard at the apex in young people, especially in the recumbent and left lateral posture. Their variation with position, and the absence of concomitant evidence of organic disease, suffice to mark them as insignificant. Even more common is the cardio-respiratory group of murmurs. These are systolic in time, vary obviously with respiration and posture, are heard in the back and other non-cardiac areas of the chest, and give no indication of cardiac disease.

The unimportance of certain varieties of arrhythmia is also discussed by Thayer, on lines already laid down in previous volumes of the Annual.

Valvular Disease of the Heart.—Wyard[8] describes his experiences as member of a Standing Medical Board in relation to 'V.D.H.' A large proportion of all cases seen by the Board were referred to it with a diagnosis of valvular disease of the heart, but in over 50 per cent of these the Board was unable to confirm the diagnosis. Wyard argues from this that if a similar proportion of wrong diagnoses was made in the examination for recruits, there has been a large and unnecessary loss of man-power from the Army. His summary of the whole matter is as follows: "Auscultation is not alone sufficient to establish a diagnosis of valvular disease of the heart, and, if too much relied on, will sooner or later lead to grave errors. It is not enough merely to listen, but the senses of sight and touch must also be called upon for aid. In fine, it may be said that a heart normal

in size, regular in its rhythm, and giving rise to no symptoms, may be assumed to be perfectly healthy, whether or not a murmur or murmurs be audible in its neighbourhood."

[The writer's experience has been like Wyard's. Vast numbers have been rejected from enlistment or recommended for invaliding out of the Army, on no surer ground than the presence of an unimportant and often transitory murmur. This is still going on, but not to the same extent as at the beginning of the war. Similarly, an altogether exaggerated importance is sometimes attached to sinus arrhythmia of a pronounced type. It is safe to lay down the rule that, for military purposes, an irregular pulse does not count except it be accompanied by signs of organic disease or symptoms of the well-known soldier's-heart syndrome. *See* MEDICAL ANNUAL, 1917, p. 478; and 1918, p. 248. — C. F. C.]

Problems of a similar kind have confronted Priestley[9] in his study of heart disease in *elementary school children*. In his experience deviations from the 'normal' are met with in as many as 40 per cent of the children examined. Rejection of trivialities brings this down to 6 or 7 per cent, the latter figure standing for those cases of heart affection which no one would deny to be worthy of note. The difficulty of distinction between true heart disease and its counterfeits is even greater in children than in adults, because children so rarely complain of obviously cardiac symptoms. As Priestley's analysis shows, even in the children with organic heart disease the symptoms were far more often those of general toxæmia than of any mechanical cardiac disability. Dilatation, as evidenced by projection of the apex beat well beyond the left nipple and distinct increase of the precordial dullness in either lateral direction, he finds to be fairly common. A group of these was followed up for three years, by which time about one-fifth had developed evidence of genuine organic disease.

"Humming, continuous bruits may be heard at the root of the neck or about the sternoclavicular joints, and are, of course, never taken to portend any organic disease. Equally 'functional' are taken to be great numbers of gentle, sipping, soughing murmurs resembling interrupted bruits, systolic in time and heard at any of the valvular areas. They are particularly likely to be found at the pulmonary area. They are commonly thought to be present in the anæmic, but a surprising number of well-coloured children have them in typical form. One comes to note them and dismiss them from mind by an act of intuition, and it is not always easy to explain why one has so curtly dismissed them. If the murmur is soft, gentle, and little audible, if it is in the pulmonary area, if it is accompanied by similar soft murmurs at other valvular areas, if it is present at one inspection and not at the next, these circumstances one or all create a bias in favour of the 'hæmic' or 'functional' view."

"Accentuation of the second sound, mainly the pulmonary, is very common in childhood, as also is a reduplication of the first sound heard at the apex, converting 'lub-dupp' into 'thrub-dupp.'"

The Bock differential stethoscope is of value, according to Ramsay,[10] as a means of estimating the efficiency of the myocardium. The principle depends upon the fact that the normal ratio of intensities of the first sound at the apex to the second sound at the base is approximately 2 : 1. It has now been established that this ratio is frequently altered when the myocardium is affected, and that it may become 1 : 1.

It occurs to the critic at the outset that some heart sounds are very difficult to hear on account of emphysema or of a stout chest wall. But it must be remembered that this stethoscope is for estimating intensities of sound at the apex and base in the same individual, and that any such difficulty is almost certainly present at both apex and base. That is to say, the stethoscope is a differential one, and it is so made that intensities of sound can be estimated with great accuracy in each case. This is arranged by means of a hole through which the heart sounds pass to the observer's ears. The hole can be increased in size, or entirely obliterated, by turning a screw (attached to the top of the chest-piece) in one or other direction. To the screw is fixed a small pointer which works round a scale on which, at equal intervals, are the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100. When the pointer is at 100, the hole in the interior of the chest-piece is entirely closed, and no sound reaches the ear of the observer.

To use the stethoscope, the hole is first closed by bringing the pointer to the 100 mark. The chest-piece is then placed over the apex, and the pointer is turned counter-clockwise till it reaches the figure 10. At this mark the heart sounds will be heard with a clearness almost, if not quite, equal to that conveyed by an ordinary chest-piece. The pointer is again moved round, this time clockwise, until the first sound is indistinguishable; this usually occurs in a normal heart when the pointer is near to the 80 mark. The pointer is then moved back to 10, and the chest-piece is placed over the aortic base. The pointer is once more moved in a clockwise direction, and the observer's attention is focussed on the second sound, which in a normal heart becomes inaudible when the pointer is in the neighbourhood of mark 45. These figures are those given in the maker's circular which accompanies the stethoscope. The ratio of intensity therefore, of first sound at apex and second sound at base may be represented by 80 : 45.

The results quoted by Ramsay suggest that this instrument may prove of value if used sanely in conjunction with all other methods of examination.

Treatment.—The bulk of the literature bearing on the treatment of heart disease is still limited to the discussion of means of meeting and preventing cardiac breakdown. As Abrahams[11] remarks, however, the ideal plan of treatment, which is slowly being realized, is based on a knowledge of the causation of the disease under treatment. Thus alone may we hope to strike at the root of the disease and cure it, or at all events prevent its extension. Abrahams recommends,

for example, that in all cases of rheumatic heart disease, foci of infection, such as the tonsils, should be cleared out, anæmia treated, and **Sodium Salicylate** with **Bicarbonate** given for a week every two or three months. Syphilitic heart disease should be similarly treated. In his opinion **Salvarsan** may be safely given, no matter what the lesion.

Among the other remarks in this very sound paper may be selected those recommending the subcutaneous use of **Morphia** in severe cardiac dyspnœa; the **Calomel** treatment of dropsy (3 gr. t.d.s. for three successive days, with 10 gr. of **Sodium Bicarbonate** per dose): **Diuretin**, 20 gr. every two hours for twelve consecutive doses, a plan of value in obstinate dropsy; and **Cymarin**, the active principle of apocynum, in pills or hypodermically. The pill is given every four hours, and according to Abrahams may do wonders in the reduction of dropsy.

Digitalis.—It is in *auricular fibrillation* that this drug is pre-eminently valuable. This symptom-complex, it will be remembered, is a terminal phase of many kinds of heart disease, but especially of chronic post-rheumatic fibrosis of the mitral valve. It is marked by (1) disappearance of all evidence of auricular systole, (2) a totally irregular pulse which graphic analysis traces to (3) disorderly formation of impulses in various parts of the auricular wall, and (4) rapid irregular contraction of the ventricle under the influence of the stimuli descending to it from the auricle. These phenomena are accompanied by a serious increase in dyspnœa and other evidences of cardiac embarrassment. Cushny's[12] lecture is devoted to an explanation of the remarkably beneficial action of digitalis when given under these circumstances. He has found that digitalis has a direct action on the auriculo-ventricular conducting tissues which delays the transmission of impulses, and that by virtue of this action the drug reduces the number of stimuli reaching the ventricle, the pulse being thus slowed and steadied. The curious point is that it is only on the fibrillating diseased heart that digitalis exerts this direct inhibition of conductivity. On the normal heart it has no such effect. The probable explanation is hinted at by the fact that experimentally digitalis can be made to exercise this effect on an ill-nourished heart but not on a normal one. The heart of auricular fibrillation being perforce in a state of malnutrition—or this arrhythmia would not occur—it is open to the action of digitalis which has been described above.

One useful method of watching the action of digitalis in auricular fibrillation is alluded to by Cordinier.[13] He speaks of the difference between the number of cardiac beats and the number of beats at the wrist as the 'pulse deficit.' For example, a patient with auricular fibrillation has 140 beats per minute if they are counted at the apex, but only 80 of these are powerful enough to make themselves felt at the wrist. The pulse deficit in such a case is 60. Digitalis, if acting successfully, should reduce this deficit: not by increasing the number

of effective beats, those which reach the wrist, but by reducing the number of ineffective beats, those only felt or heard at the præcordium.

But the beneficial action of digitalis in heart disease is not limited to its power of controlling the arrhythmia of auricular fibrillation. Cordinier quotes a case of *auricular flutter* (a paroxysmal type of tachycardia of auricular origin) when digitalis reduced the fast rhythm, first to one of bigeminy, and ultimately to the normal. Sutherland[14] quotes a somewhat similar case, and also another in which he thinks the rapid regular action of a heart the seat of acute rheumatic carditis was quieted by the administration of digitalis.

So far we have considered conditions of auricular exhaustion which are benefited by the use of digitalis. Windle[15] comes forward to claim that it may be usefully given in cases exhibiting an *alternating pulse*—i.e., an alternation of strong and weak beats, the beats being of equal length, and varying only in their amplitude. This, the alternating pulse, is always an index of feeble contractility of the left ventricle, and as such is usually associated with advanced and serious heart disease. Windle finds that digitalis is capable of reducing or even abolishing this alternation, the symptoms showing a parallel improvement. This is probably due to increase of tonicity and slowing of the cardiac beat. The alternation is likely to return, but the digitalis is worth giving in such cases even though its beneficial effects be only temporary.

It is not to be wondered at that an effect such as that which digitalis exerts in auricular fibrillation—depression of conductivity—and, as we have seen, only in the presence of myocardial dystrophy, should not infrequently pass beyond the domain of what is convenient to that of morbidity. Such an example is recorded by Barker and Bridgman,[16] whose patient, under the influence of digitalis, had developed a partial heart-block, with very long conduction intervals. A somewhat analogous effect, perhaps, is that noted by White[17] in three instances. The electrocardiograms in these cases showed a temporary but complete disappearance of all sign of auricular systole. White christens this 'auricular standstill,' and ascribes it to the effect of digitalis.

Where it is desirable, owing to the urgency of the symptoms, to produce the digitalis effect quickly, in a case of auricular fibrillation, **Strophanthin** may be injected intravenously, in doses of 1 mgrm. Hay[18] has used it many times, and claims that its speedy action has saved life in urgent cases. There is immediate improvement, shown by sharp reduction in the pulse-rate, easier breathing, and diminution of subjective distress. This improvement can be maintained by following up the strophanthin with a course of digitalis given in the ordinary way.

For the further employment of **Strophanthin,** *see also* p. 28.

Marfori[19] pleads for an extended use of **Camphor,** not only as a last resort in the moribund, but also a cardiac tonic given systematically in injection of 0·1 grm. once or twice daily. The indications for its

use are many, and the list given by Marfori includes nearly every variety of cardiovascular disease.

Physicotherapeutics.—Graham[20] makes an interesting comparison of the value of the various physical methods employed in the treatment of heart disease. He gives the first place to **Massage.** Applied over the region of the heart, he says, "it has a powerfully tonic and sedative effect on that organ." Further, "general massage, carefully administered, is of great aid to the peripheral circulation, lessens the work of the heart, tranquillizes the nervous system, and induces sleep in the worst kind of heart disease; and massage of the abdomen often works well as a diuretic and to relieve the stasis of the mesenteric and all the other abdominal veins."

Of **Resistive Exercises** of the Schott type, he says that they are especially adapted for the initial treatment of fatty infiltration of the heart; and also in chlorosis, and chronic valvular disease of the heart, when combined with other necessary measures. They should not be used in cases of cardiac neurosis, convalescence from acute carditis, or advanced cardiosclerosis. As to the **Effervescent Bath** treatment, he regards it as an unnecessary elaboration of a very simple method—that of using cutaneous stimulation for its reflex cardiotonic effect.

Apparently this brutal scepticism as to the value of the **Nauheim Bath** is spreading. Lieb,[21] writing from an American spa, complains of the cold indifference with which this is now regarded by the profession. He claims that the natural waters give a combination of therapeutic agents—carbon dioxide, salts, radium and heat—which cannot be artificially reproduced. The pharmacological effects are stated to be increase of cardiac tone and contractility, peripheral vasoconstriction, diuresis, and deepening of respiration. The treatment is of use in arteriosclerosis if only moderate and not associated with high blood-pressure. Its value in the high-blood-pressure cases depends on the cause; the types for which Lieb specially recommends it are the 'essential' and the 'neurogenic' types. In nephritic cases he thinks it worthy of trial. It is not wise to apply it, however, if the pressure be over 200 mm. Hg. Low-tension cases, he thinks, offer the best field for the use of the baths. For myocardial degeneration in early stages they are of value, for advanced cases they are contraindicated, and for those lying between the two extremes the baths should only be used after a preparatory course of general treatment. For valvular lesions this treatment may be adopted if the heart muscle shows itself capable of responding to it. Mild anginal cases are much benefited, but in the severer types it is strongly contraindicated. In treatment of the obese heart the Nauheim plan is a valuable adjunct. Thorne Thorne[22] finds the method of great value for angina pectoris of all degrees, always provided that it is so arranged that it is carried out with the minimum of exertion for the patient. He ascribes this to the dilatation of the capillaries which ensues upon a Nauheim bath.

Another form of physicotherapy used for heart disease is the **Bergonié Electric Chair.** The principle of this is rhythmic electrical stimulation of the skeletal muscles, at a rate approximating to that of the heart. By this means the rate of the heart, it is alleged, can be brought to that of the electrical rhythm. Crabbe[23] describes some cases treated by him. These are interesting, but it is difficult to discover precise indications for this method of treatment.

Treatment of Cardiac Disorders in the Obese.—Circulatory disturbances of some importance are frequently observed, according to Buck,[24] in the wealthy obese citizens of American cities. It is not so much that fatty infiltration of the myocardium is in itself responsible for these disturbances, as that it is a factor predisposing to breakdown when the heart begins to find itself tackling the extra burdens imposed by emphysema, arteriosclerosis, granular kidney, and the like. For such people a **Diet** should be arranged which aims at reducing the total calorie value of the food taken, so that the excess body fat may be used in supplying this deficiency, while protecting the general nutrition of the body. Careful inquiry into the patient's usual diet will ordinarily furnish a basis for a scheme of reduction, and there is no need to make out a strict diet scale. Usually, Buck finds, these people eat too much bread and butter, and this must be reduced, compensations being arranged in the shape of potatoes and other vegetables. In severe cases with œdema and other such symptoms, rest in bed is indicated, and the diet should at first be restricted to skim milk, cooked fruits, and eggs. Progress is to be checked by systematic weighing of the patient.

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HEART, SOLDIER'S. *C. F. Coombs, M.D., F.R.C.P.*

The task set before the medical services of a nation at war is two-fold : first, to maintain the health of the combatants ; and, second, to restore to a maximum of usefulness those who have become crippled. To what extent are we succeeding in relation to the problem of 'soldier's heart'? It is a very wide problem, almost as wide, perhaps, as those of the 'shell-shock' group of injuries. Whole hosts of men in all armies are rendered unfit for service by reason of cardiac disabilities. What are the reasons ? What is the chance of recovery ? How is it to be accomplished ? These are the questions every nation warring to-day asks of its medical services. To the credit of Britain it must be claimed that our nation has made a more thorough attempt to get a definite series of replies than any

other. The bulk of the remarks set down below is drawn from a report to the Medical Research Committee of the National Health Insurance Service, which summarizes the researches of a group of workers at a Hampstead hospital specially set apart for the purpose. (*See also* MEDICAL ANNUAL, 1917, p. 478.)

ETIOLOGY.—There is a general consensus of opinion that this disorder or group of disorders is but one aspect of the wear and tear of war with which we are all becoming so familiar. Under the excessive mental and physical strain of warfare the circulatory apparatus breaks down. This is delayed if the individual be of an abnormal toughness, and, indeed, it may not arrive at all. The problem that is still unsolved is that of assigning to the muscular and nervous elements of the circulatory apparatus their respective importance in this progressive wear and tear.

Certain facts suggest that the myocardial element in this breakdown is an important one. One of these facts is the relatively large percentage of 'soldier's heart' cases who give a history of some previous rheumatic infection. The inference here is, that the damage done to the myocardium by this infection did not clear up entirely. It remained latent, and did not amount to demonstrable disease. The heart was fit to respond to the calls of civil life, and so there were no symptoms. Not till the extra demands of military training and the stress of active service were laid upon it was its inadequacy manifest. Add to this the fact that in many cases the onset of symptoms seems to date from some infection incurred during military service—dysentery, trench fever, and so on—or to some such intoxication as poisoning by lethal gas, and you have a large proportion of all the cases of 'soldier's heart' accountable for as a myocardial lesion due to infection.

But there are a number of reasons which forbid one regarding this hypothetical myocardial lesion as the sole basis of this syndrome. The relation which certainly exists between infections and the onset of symptoms may equally well be explained on the other basis, that of a general exhaustive process in which the nervous control of the circulation suffers severely. The fact that in few cases does the onset date from a definite physical strain also argues against the purely myocardial theory. Again, systematic electrocardiography has failed to detect any evidence of myocardial injury in nearly all the cases examined (Parkinson). The age-incidence of the syndrome is not in favour of the myocardial hypothesis. The writer's own experience goes to show that young soldiers are far more frequently incapacitated by 'D.A.H.' than the older men of the permanent-base type. If inadequate heart muscle alone were responsible for the symptoms, we should find precisely the opposite.

On the other hand, there is much to show that the nervous factor is of great importance. The findings of the Research Committee show that the greatest incidence of the disorder falls upon men who, prior to enlistment, were engaged in sedentary occupations, men of

a nervous and non-military cast of mind, to whom the terrors and hardships of modern warfare are a far greater burden than to those of hardier and less nervous temperament. Rudolf has stated the whole matter in terms which can hardly be bettered. He says: "The condition called 'soldier's heart' is not an entity, but includes merely the worst examples of a circulatory instability that grades up from the nearly normal to a degree that may completely incapacitate the patient. This instability has often been there before enlistment, and is merely brought into prominence or exaggerated by the unusual physical and mental surroundings of a soldier's life. The same condition occurs, only more rarely, in civil life. In many cases it appears to be caused or precipitated by infection, with consequent toxæmia, also by nerve shock or strain; but in many instances no such clear origin can be traced. The condition appears to be essentially one of neurasthenia in which the circulatory apparatus happens to show the most symptoms." Sir Clifford Allbutt also writes of the disorder as "cardiac neurasthenia—not uncommon in the civil population; but under the stress of the soldier's training, amongst the aggregations of men in modern armies, it is more conspicuous and inconvenient."

It may well be agreed, then, to regard this syndrome as the outcome of stress of various kinds, involved in military service, telling upon the nervous and muscular parts of the circulatory machine to their eventual undoing. In passing, it may be remarked that Kramer has found many cases in the mobilized but non-combatant army of Holland.

Diagnosis.—The first problem in diagnosis is to separate out from the mass of men complaining of cardiac symptoms, that small percentage in whom there is some definite organic lesion. This percentage is wonderfully small in the British Army at the present day. It may be remarked in passing that the discovery of some organic lesions does not justify the recommendation of a man for discharge unless he is suffering also from severe and increasing symptoms. Men with mitral stenosis and aortic regurgitation, but with little or no dyspnœa, can often be employed in sedentary capacities or in various base occupations, and may perhaps be recommended for reclassification by a Board.

When these have been sifted out, a large number of cases remain. The next problem is to determine which of these should be regarded as invalids, and which as normal, or capable of further service without undergoing prolonged treatment. Due regard must be paid to the man's general condition. If he is thin and pale, shaky and obviously exhausted, he should be removed from immediate service even if his cardiac symptoms are not absolutely urgent. But so far as his circulation is concerned, the two chief criteria are the pulse-rate and the presence or not of dyspnœa on exertion. As to the first, the easiest and best way is to take the rate of the pulse when the man is (*a*) lying flat, (*b*) sitting up, (*c*) standing erect, and also (*d*) after a short walk; finally, to note the rapidity with which the pulse

acceleration provoked by mild exercise dies away again. As a rough test, for use in everyday military practice, this is probably the most serviceable. A pulse which, moderately quick even during rest, speeds up immediately with change of posture, and only returns gradually to its previous rate, is a sound indication for the need of further observation and treatment. The test by exercise, to observe whether or no dyspnœa is provoked, ought to be carried out in a systematic manner, such as is adopted, on the recommendation of the Hampstead workers, at various large centres in Britain and overseas. Here squads of men undergo testing and training by exercise in such a way as to serve four purposes. First, it is possible to decide whether the patients need further treatment. Second, those who are found unfit for service can be classified according to the type and duration of treatment they are likely to need. Third, their progress towards recovery can be measured. Fourth, the exercises constitute in themselves the soundest therapeutic measure as yet discovered.

Prognosis.—Figures furnished by the Hampstead workers show that the **Graduated Exercise** treatment which they advocate has materially reduced the average period of hospital life in these cases. Investigation of after-histories showed that three months after discharge from hospital about 30 per cent were regarded as capable of full duty, another 53 per cent for light duty, the remainder being unfit for duty of any kind. These figures show how obstinate and disabling this disorder is.

As to ultimate recovery and fitness for civil life, it is, of course, impossible to speak as yet. But with the cessation of war it is certain that one factor that is probably responsible for the prolongation of many cases will be removed—that state of nervous dread in which so many of these patients live. The recovery-rate will therefore be better than our experience during the war period has led us to expect. Some writers, whose experience was founded on the Balkan wars, say that premature arteriosclerosis is common in men who have suffered from 'soldier's heart.' This remains to be seen; but it is likely to be true that men of the soldier's-heart temperament will be prematurely aged by their war experiences.

Two special points may be noted in passing—the unfavourable nature of the cases with a history of rheumatic infection, and the favourable nature of those whose symptoms date from 'gassing.' In other words, those whose troubles are referable to probable structural disease of the cardiovascular tube are not so likely to recover as those who have no such enduring foundation for their symptoms.

Treatment.—For the cure of these people three things are necessary: time, the right mental atmosphere, and **Exercises** supervised by skilled and sympathetic observers. As for the first, while it is true that it is of no use hurrying to get these men well, it is equally true that a policy of drift—leaving them to hang about in hospitals without any sort of direction—is disastrous. Rest in bed and the other measures usual to convalescence are, of course, indicated during

convalescence from enteric, malaria, and other infections, especially if there be evidence of myocardial damage. As Garrod points out, exercise treatment must be withheld here till one is assured that the myocardium is recovering. The right mental atmosphere lies in freedom from anxiety. The man must be convinced that his malady is curable, and that he is going to be fit to serve his country again in some capacity. It is scarcely possible to write down an account of those measures which may be used for setting him free from that tyranny of fear which is so largely responsible for his troubles, but such measures do exist. All that can be said here is, that he must be sympathetically encouraged to face the things of which he is afraid, and to discover in them nothing that is unconquerable.

The exercises that are now adopted are taken from the army system of physical drill. They are fully described in the report to the Research Committee, which should be consulted for details. The principles that are observed are: (1) Close observation of the degree of exercise that can be undertaken without distress; (2) Increase in amount of exercise taken *pari passu* with the man's improvement.

Drugs are of no use except so far as they attack anything that may be regarded as a causal factor. Digitalis has no effect (Parkinson). **Bromides** in the early stages may help to get the man's mind quiet, but at best they only constitute a very secondary adjuvant to the main principles described above. It is better to cut out tobacco altogether (Parkinson), at any rate at first. Those who are subject to giddiness after exertion or on change of posture are sometimes helped by a broad tight **Abdominal Binder.**

LITERATURE.—*National Health Insurance*, Medical Research Committee: Special Report Series, No. 8, 1917; Allbutt, *Brit. Med. Jour.* 1917, ii, 139; Ivy Mackenzie, *Glasgow Med. Jour.* 1916, ii, 193; Abrahams, *Lancet*, 1917, i, 442; Wybauw, *Arch. Med. Belges*, 1917, 714; Rudolf, *Canad. Med. Assoc. Jour.* 1916, Sept.; Goodall, *Med. Press and Circ.* 1917, ii, 136; Vigevani, *L'Osped. Maggiore*, 1917, June, 273; Kramer, *Nederl. Tijdschr. f. Geneesk.* 1916, 2347; Parkinson, *Heart*, 1917, 317 and 322; Parkinson and Drury, *Heart*, 1917, 337; Parkinson and Koefod, *Lancet*, 1917, ii, 232.

HERNIA, SURGERY OF,

E. Wyllys Andrews, M.D., F.A.C.S. (Chicago).

Razzetti[1] and Campora[2] both report cases of *lumbar hernia*, and the latter gives an extensive review of the literature, tabulating 166 cases. Both the hernias reported came through Grynfelt's space, and not through Petit's triangle. This is in contradiction of the usually accepted ideas of lumbar hernia; but in the majority of the cases enumerated by Campora, Grynfelt's space seems to have been the site of the hernia. The treatment consists of dissecting free the sac as far as possible into the abdomen, ligating and cutting it off. Two or three muscular sutures easily obliterate the space.

Moschowitz and Neuhof[3] have endeavoured to determine by animal experiments whether the iliohypogastric nerve in the inguinal canal has a motor function. The anterior motor roots were sectioned, and

the iliohypogastric nerve in various parts of its course was examined for degenerative changes. The conclusions were that the motor fibres of the internal oblique muscle were given off before the nerve entered the inguinal canal; consequently, injury to the nerve in the

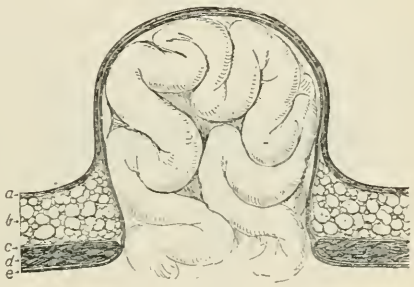

Fig. 26.—A sectional view of hernia. The contents may be disregarded; the construction of the sac is the important feature. The different structures are lettered the same throughout: (*a*) Skin; (*b*) Subcutaneous tissue; (*c*) External fascia covering the abdominal muscles; (*d*) Muscular layer; (*e*) Internal muscular fascia and peritoneum. (*Figs.* 26–30, *reproduced from the* '*New York Medical Journal.*')

inguinal canal during herniotomies could have no ill effect in the healing or cause muscular atrophy. Nevertheless, such injury should and can be avoided easily, because of resulting pain or anæsthesia, if the nerve is cut or included in suture.

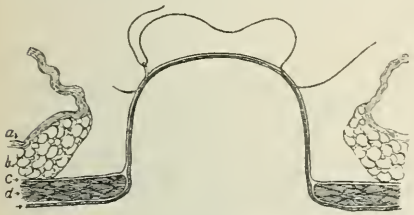

Fig. 27.—The figures 27 to 30 inclusive depict the steps in the operative treatment when the sac is not opened. This shows the skin dissected from the thin sac and the skin and subcutaneous tissue dissected back from the hernial orifice so as to leave a wide margin of the adjacent fascia cleanly exposed. The first suture, to take up the slack or fullness in the sac, is shown. This suture is often omitted.

Stanton[1] gives a very interesting report of 500 laparotomies from which developed 24 hernias. From rectus and mid-line incisions in originally clean cases there ensued but 3 hernias. In 186 similar incisions for acute intra-abdominal infections and conditions requiring

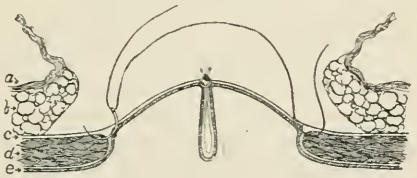

Fig. 28.—A cross-section to show the infolding produced by the first suture and the placement of suture No. 2. While the needle is represented as being inserted at right angles to the hernial margin, in reality it is introduced parallel with the margin of the hernial opening and penetrates deeply into this margin.

drainage there were 18 hernias. Frank suppuration along the fascial planes was unquestionably the cause of 14 of the 24 hernias. In 8 of the remaining 10 a milder degree of infection was present, and at least partially responsible. Only one hernia developed in a wound healing by first intention.

The author found that drains are not as big a factor as commonly supposed in the production of hernias. He found no case with a hernia due to distention or to muscular atrophy from the severance of nerve supply. The McBurney incision was followed by hernia more frequently than any other.

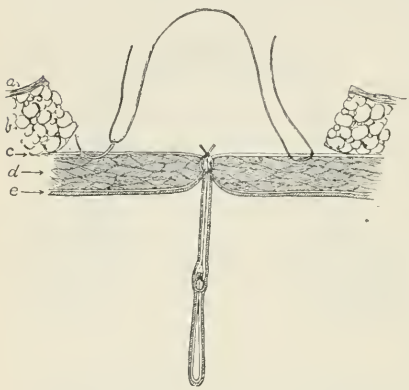

Fig. 29.—Suture No. 2 has been tied and the muscle edges of the hernial orifice have been brought together. Suture No. 3 is shown in place.

Haines[5] reports twenty-two cases of very large *ventral hernias* operated on by him. The smallest was the size of a grapefruit. All were treated by the author's inversion method. There was no mortality, and all the wounds healed by first intention. [A remarkably good result in such enormous plasties.—E. W. A.] The excellent illustrations given explain the method (*Figs.* 26–30).

Giuseppi[6] reviews the literature of *femoral hernia.* Out of 424 cases reported when the canal was closed at the lower end, 72 per cent were cured, and when it was not closed at all, 63 per cent were cured. The author believes that closing the canal at its upper end will give better results still. The ideal method of accomplishing this is Lotheisen's operation. This consists in freeing, ligating, and excising the sac in the usual manner through an incision in the external oblique aponeurosis in the lower part of the inguinal canal. The conjoined tendon is then sutured tightly to Cooper's ligament, thus covering the upper end of the femoral canal. He reports ten cases operated on by this method with very satisfactory results, no recurrences having taken place.

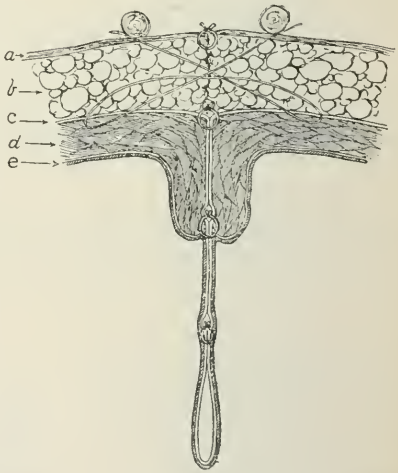

Fig. 30.—Suture No. 3 has been tied and the surfaces of the fascia over a wide area have been brought in firm contact. This last suture rolls inward, the edges of the muscles forming the hernial orifice. A figure-of-eight retention suture is shown in position, to be tied over rolls of gauze; and the skin edges coaptated by a last stitch.

L. Davis[7] analyses 1500 cases of *inguinal hernia* operated on by the attending staff of the Massachusetts General Hospital. Of

these, 754 could be traced by the 'follow-up' system in use. The number of recurrences is surprising—8 per cent. The reasons given ranked as follows: (1) Cough; (2) Hæmatoma; (3) Sepsis. Of 88 direct hernias, 15 per cent recurred, showing the difficulty of holding the atrophied internal oblique and conjoined tendons on to Poupart's ligament. Another interesting point which appeared was, that a great many patients, though anatomically cured, still complained of pain in the inguinal region, especially on exertion. Of the operations, 75 were done under local anæsthesia, and of this number but 2 per cent recurred—a striking contrast. The author points out the lessons to be derived: (1) Careful anæsthesia, and possibly a freer use of local, to avoid pulmonary complications with resulting cough; (2) Careful hæmostasis; (3) Rigid aseptic technique. [In my own experience I have always found sepsis to be by far the most frequent cause of recurrences.—E. W. A.]

References.—[1]*Gac. méd. de Caracas.* 1916, xxiii, 113; [2]*Gazz. deg. Osped. e. d. Clin. Milano.* 1917, xxxviii, 513; [3]*Ann. Surg.* 1917, lxvi, 79; [4]*N. Y. State Med. Jour.* 1916, xvi, 511; [5]*N. Y. Med. Jour.* 1917, Jan., 10; [6]*Clin. Jour.* 1916, Sept., 330; [7]*Jour. Amer. Med. Assoc.* 1916, Aug., 480.

HICCOUGH. *Herbert French, M.D., F.R.C.P.*

Aquino[1] records the case of a young man who was completely exhausted by the incessant hiccough which had tormented him for over twenty-four hours. Bromides gave no relief, and a dose of morphine only a brief respite. A seidlitz powder caused much discomfort, but did not arrest the spasms of the diaphragm as hoped. Flexing the thighs on the abdomen to force up the viscera, massage, and rhythmic traction of the tongue also proved futile. But the hiccough stopped at once when the **Eyeballs were Compressed** as for the oculocardiac reflex. The radial pulse grew slow, the hiccough stopped, and the exhausted man dropped to sleep at once. A return of the hiccough next day was aborted by the same procedure. It also proved effectual in a case of hiccough from purulent pleurisy.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 159.

HODGKIN'S DISEASE. *Herbert French, M.D., F.R.C.P.*

Cole[1] draws fresh attention to the fact that skin eruptions may occur in cases of lymphadenoma, and that the skin changes may attract more notice than those in the glands and spleen, so that the true diagnosis may be missed. Among 33 cases of Hodgkin's disease, 13 involvements of the cutaneous surfaces were noted. Pruritus was the principal complaint eight times, a prurigo-like exanthem was seen six times, a bronze-like pigmentation four times, petechiæ twice, urticaria once, and œdematous swellings thrice. *Fig.* 31 illustrates one of the cases he records. The original paper should be consulted for illustrations of the histological appearances of the skin from the affected parts. The author divides the cutaneous lesions into two main types, namely: (1) A true lympho-granulomatosis cutis—deposit

of lymphadenomatous material in the skin itself; (2) A group of lesions set up by the general infection, but not showing the characteristic histological changes locally.

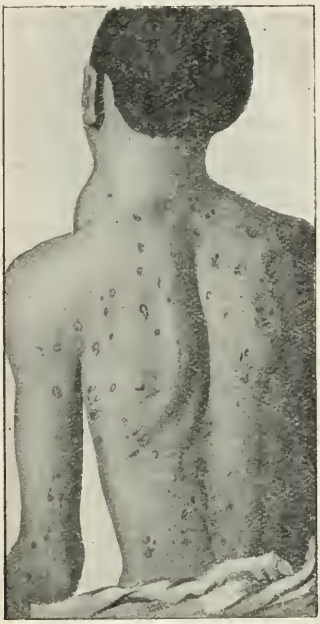

Fig. 31.—Prurigo-like exanthem in Hodgkin's disease. (*Redrawn from the 'Journal of the American Medical Association.'*)

In the 1916 issue of the MEDICAL ANNUAL (p. 378) we referred to the researches of Bunting, Yates, and others upon a diphtheroid bacillus that was recovered from freshly excised glands in cases of lymphadenoma, and which was reported from several different sources as the probable cause of Hodgkin's disease. The organism itself exists, but doubts have already been thrown upon the view that it is causal in the disease. Cunningham[2] has carried out extensive work upon the subject in the Pathological Laboratory at the Roosevelt Hospital, New York; and he concludes that the micro-organism in question is a laboratory contamination due to faulty technique, and that it is not the cause of Hodgkin's disease. Doubtless other workers will test this view further, but in the meantime one feels that Cunningham's conclusion is probably correct, and that we are as far as ever from knowledge of the true nature of Hodgkin's disease.

REFERENCES. — [1] *Jour. Amer. Med. Assoc.* 1917, ii, 341; [2] *Amer. Jour. Med. Sci.* 1917, i, 4060.

HOOKWORM DISEASE. (*See* ANKYLOSTOMIASIS.)

HYDROCEPHALUS. *J. Ramsay Hunt, M.D.*

The treatment of hydrocephalus has been most discouraging. One operative method after another has been advocated as a possible means of successful drainage; one or two cases are reported, and then nothing more is heard of the method, the patients having died.

The chief cause of failure, according to William Sharp,[1] is not due so much to the ignorance regarding the nature of hydrocephalus itself, what the cerebrospinal fluid really is, its method of secretion and excretion, and similar points, as to a lack of appreciation that the condition of hydrocephalus is rarely limited to a dilatation of the ventricles alone—the so-called hydrocephalus interna—but is due frequently to a lessened excretion of cerebrospinal fluid through the subarachnoid cranial and spinal veins, the sinuses, and possibly

the lymphatics, i.e., hydrocephalus externa. It is hydrocephalus externa that is most frequent, and yet the methods of treatment have been almost all of them directed to a drainage of the ventricles, whereas the ventricles require drainage in only a small percentage of the cases; they are not dilated as a rule, because the aqueduct of Sylvius and the foramina of Majendie and Luschka are not obstructed, and there is a free escape of cerebrospinal fluid from the ventricles into the subarachnoid spaces, so that any operation merely directed to connect the ventricles with the subarachnoid or subdural spaces in those cases is of no possible benefit.

In order to differentiate hydrocephalus interna and externa, the method of Dandy and Blackfan is useful, whereby the time of excretion of phenolsulphonephthalein from the ventricles and from the spinal subarachnoid space can be observed and the amount estimated in the urine; if they are practically of equal duration and amount, then the ventricles are not blocked and the condition is one of hydrocephalus externa, or of both; whereas, if the excretion of phenolsulphonephthalein injected into the ventricles is greatly delayed and lessened in amount in the urine, then the ventricles are blocked and the condition is one of hydrocephalus interna.

Sharp presents a new operative method for the treatment of this grave and intractable disorder. The following is the procedure: A ventricular-puncture needle is inserted into the ventricle through a very small skin incision at the anterior fontanelle as far from the median line as possible, and at the same time a spinal-puncture needle is inserted into the lumbar subarachnoid space; with the patient lying upon his side, the median line of the head being upon an exact level with the spinal canal and the patient being perfectly quiet, the pressure and rate of flow of the cerebral fluid from both the needles should be the same if the ventricles and subarachnoid spaces are in free communication; the condition would therefore be one of hydrocephalus externa. If however, the ventricles are blocked, the pressure and rate of flow of cerebrospinal fluid from the ventricle needle is greatly in excess of that from the spinal puncture needle, which may be but a few drops; the condition then would be one of hydrocephalus interna.

The operation consists of an attempt to drain permanently the ventricles (in the internal type of hydrocephalus) and the subarachnoid and subdural spaces (in the external type of hydrocephalus) through the usual opening of a subtemporal decompression. As drainage tubes buried in the body tissues usually become blocked by adhesions, connective tissue, etc., six linen strands are inserted into the ventricles in the internal type, and merely into the subarachnoid and subdural spaces in the external type, of hydrocephalus, and their ends brought out through the temporal muscle and temporal fascia beneath the scalp in a stellate manner; as these linen strands cannot be absorbed in the body tissues until four to six months have elapsed, it is hoped that by the time of their absorption these

artificial channels would be lined with endothelium or epithelium, and thus their permanency and patency be assured.

Sharp has used this method in 39 patients, with 13 deaths. In those who lived the results have been quite encouraging. The ages ranged from ten days to four years, and the greatest improvement occurred in the younger children.

Reference.—[1]*Amer. Jour. Med. Sci.* 1917, i, 563.

HYPERIDROSIS. *E. Graham Little, M.D., F.R.C.P.*

Stillians[1] recommends the application of a 25 per cent solution of **Chloride of Aluminium** in distilled water for localized excessive sweating, with or without bromidrosis. The application is allowed to dry on, and is renewed every second or third day. Three applications at these intervals may be made, and then the parts should be left for a week, or until recurrence shows itself. The lotion should be allowed to dry completely before clothing is resumed. If the application causes itching, an ointment of **Cold Cream** with 12 per cent **Boric Acid** will usually relieve it.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1916, ii, 2015.

HYPERTRICHOSIS. *E. Graham Little, M.D., F.R.C.P.*

MacKee[1] discusses the use of **X Rays** for removing superfluous hair, and on the balance of pros and cons he decides against it. He considers that the possibility of effecting a permanent defluvium without injury to the skin is established, but the technique is very difficult, and wrinkling and atrophy are very likely to supervene, and be a notable disfigurement, which may be delayed for several months, but is seldom entirely absent. This treatment should therefore be undertaken only in very urgent cases, where **Electrolysis** is impossible, or where the patient, as sometimes happens, develops a depression amounting to insanity. In this case the opinion of a neurologist should be obtained in support of the necessity of removing the disfigurement.

Reference.—[1]*Jour. Cutan. Dis.* 1917, May, 171.

IMBECILITY, MORAL, IN CHILDREN.

Frederick Langmead, M.D., F.R.C.P.

Whether there exists a class of mentally defective children who should be considered 'moral imbeciles' is a point which has given rise to some discussion. W. A. Potts[1] considers that a true 'moral defective' is very rare. Of 100 consecutive admissions to a Magdalen home, he found that 37 were defective in some way, and 7 of these he classes as 'moral imbeciles.' Many moral defectives, he thinks, may be treated with ordinary defectives, but some should be segregated in a special State institution.

The presence or absence of moral sense can be recognized partly by the previous history of the individual and in criminal proceedings, partly by his conduct immediately before and after his crime. There

may be no premeditation, no adequate motive, no attempt at concealment. Also his demeanour and attitude during a trial or investigation is an important clue. A trained observer will notice that there is no sense of shame and no regret for the act. A valuable test is to get an impressive speaker to deliver a homily to the delinquent. The normal individual will evince signs of reaction to kindly words and reproof, but the moral defective shows that he has no appreciation whatever of the evil—of his criminal act. When pressed for an explanation, instead of making the usual excuses, he will probably say that he did it "for the fun of the thing." From first to last his attitude and demeanour will be those of callous indifference, and will be quite unlike those of a normal individual.

Treatment is very difficult. Prison does him no good, and he may be too wicked or too intelligent for an ordinary institution for mental defectives. Nothing but prolonged treatment is of any use, during which he must be under strict discipline, with plenty of occupation, simple active outdoor life, and no stimulants of any kind. A careful investigation must be made for any abnormality. Moral reformations have sometimes followed removal of adenoids or relief of eye-strain.

Reference.—[1]*Edin. Med. Jour.* 1917, Feb., 142.

IMPETIGO CONTAGIOSA. *E. Graham Little, M.D., F.R.C.P.*

Morrow[1] discusses the routine treatment of impetigo with ammoniate of mercury, and finds reason to prefer a method which he describes as follows: The vesicles or pustules are ruptured with gauze, the sodden epithelium which comprises part of the wall is now removed, and the base of the lesion thoroughly covered with a **Silver Solution,** the application of the remedy being made with a swab. Where crusts have formed it is usually an indication that the disease is still spreading at the base. The crusts should likewise be removed by rough friction with gauze, and the underlying areas treated with a silver solution applied in the same way as to the vesicular and pustular bases. The strength of solution recommended after trial is 20 per cent of the nitrate. There are two disadvantages to the **Silver Nitrate** method of treating impetigo, one being the temporary pain which follows its application, and the other the formation of a black crust which appears quickly and remains for three or four days. New lesions can usually be prevented by washing with **Boric Acid** solution, or with a weak solution of **Mercuric Chloride,**

It is advisable to apply with an insufflator a dusting powder, preferably one containing **Ammoniated Mercury** in the strength of from 6 to 10 per cent, and **Boric Acid Powder** up to from 15 to 20 per cent.

Adults affected with the disease should not shave and should avoid exposure to wind. Children must be isolated from other children, and new-born babies in particular must be most carefully shielded from contact with impetiginous patients, as they are apt to contract a fatal form of the disease.

Adamson,[2] describing skin eruptions common in soldiers, recom-

mends the following treatment for impetigo contagiosa, commonly the sequela of scabies, but frequently originating independently of that disease. The essential part of the treatment of impetigo is the complete removal of every scrap of crust in order that any antiseptic application may reach the site of the invading micro-organism.

The patient should be made to mop off the crusts with a wad of wool and hot water, and to continue to mop for half an hour or until every crust is removed. A lotion of 1-6000 **Hydrarg. Perchlor.** is then daubed on for a few minutes, and a diluted **White Precipitate** ointment applied (hydrarg. ammon. chlor. 10 gr., vaseline 1 oz.). The bathing and application of ointment is repeated several times daily, and continued until no fresh crusts are formed. In this way the most extensive eruptions can be cured in a few days. Without the thorough removal of crusts the ointment fails to reach all the infected parts, and the eruption continues. With wrong or inefficient treatment a secondary staphylococcal infection supervenes, and an intractable chronic impetigo or 'sycosis' results.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 176; [2]*Lancet*, 1917, i, 221.

INFANT FEEDING AND BREAST-FEEDING.

Frederick Langmead, M.D., F.R.C.P.

Mark S. Reuben,[1] writing from his experience of over 5000 cases at an infant-feeding station in New York, regards recourse to proprietary foods as a confession of ignorance. In not one of these instances did he use them, and has yet to meet the infant who could not be made to thrive on cow's milk properly modified and yet would thrive on a proprietary food. The latter is only permissible for short periods when fresh cow's milk is unobtainable. In no case did scurvy or rickets develop in a white baby.

Before the diet is ordered, a complete history of mother and infant from the day of conception must be elicited, and the infant be examined thoroughly to make sure that the malnutrition is not due to an underlying constitutional disease. The most important part of the history is that which pertains to the feeding. From this it can be determined whether it is not advisable to make further attempts to nurse the infant. Maternal nursing should be encouraged in every case in which the milk agrees with the infant; when the quantity of breast milk is insufficient, it should be supplemented by artificial food, but the child should not be weaned.

Every detail of previous artificial feeding should be gone over, and also the question of previous hygienic management. A consideration of the symptoms which the infant may present is important. Thus the time, amount, character, etc., of the appetite, vomiting, stools, sleep, and crying should be elicited. The temperature should always be taken and the state of general physical development computed.

A detailed examination and careful elucidation of the history will enable us to ascribe the malnutrition of the infant to one or more of the following causes:—

A. With suitable Diet.—(1) The presence of some constitutional disease such as lues, tuberculosis, pyloric stenosis, cleft palate, congenital malformation of the heart, exudative or neuropathic diathesis, etc.; (2) Too much or too little food in the twenty-four hours; (3) Too much or too little at a meal; (4) Too frequent feeding, or infrequent; (5) Food improperly prepared; (6) Food improperly administered—too hot or cold, or given too fast or too slowly; (7) Contaminated or poor milk; (8) Faulty hygiene, lack of fresh air, overheating, lack of proper bathing and clothing, lack of mothering, institutional life.

B. With unsuitable Diet.—(1) Fats too high or too low; (2) Sugars too high or too low; (3) Proteids too high or too low; (4) Salts too high or too low; (5) Water too much or too little; (6) Improper relations of the elements to one another.

In the presence of constitutional disease a perfect milk formula will not cause proper gain in weight until the disease has been efficiently treated. It is therefore important to be sure that the infant has a suitable diet, which should not be changed too frequently until the underlying disease shows signs of improvement under treatment.

Observations on breast-fed infants have shown that a healthy breast-fed baby requires about 100 calories to the kilo in the first three months, 90 in the second, 80 in the third, and 70 from the ninth to the twelfth month. Artificially-fed infants require from 10 to 20 more calories to the kilo than breast-fed ones. The less the infant weighs for its age, the greater is the calorie requirement. The mere estimation of the number of calories in the food of an infant with disturbed digestion serves no useful purpose. No two infants of the same age require the same number of calories; the determining factors are the weight for its age, the size, the degree of activity, and the previous state of nutrition.

Certain facts have been learned empirically. Few infants will gain in weight on less than 35 calories to the pound. Very few puny or atrophic infants require more than 75 calories to the pound. The only proper way of determining the number for a particular infant is to begin with 35 calories and gradually increase the value until a satisfactory gain results. The only accurate way of estimating if an infant is receiving too much or too little food is therefore clinical. An infant who receives too much does not finish the bottle, and is not hungry at the next meal; it usually regurgitates, and the bowels are loose. An underfed infant cries immediately after feeding and long before the next bottle is due; the bowels are constipated, and there is no gain in weight.

The quantity to be given at a meal depends on age, weight, and state of nutrition, and also on the number of meals and length of the intervals between them. A healthy infant of normal weight can take: at the end of one month, 3 oz. at a meal; two months, $3\frac{1}{2}$ oz.; three months, 4 oz.; four months, $4\frac{1}{2}$ oz.; five months, 5 oz.; six months, 6 oz.; seven months, 7 oz.; eight months, $7\frac{1}{2}$ oz.; nine

months, 8 oz. This should not be exceeded under one year of age, a good rule being to give more than the weight and less than the age would indicate.

An infant should never receive more than seven meals in twenty-four hours, and never be fed more frequently than every three hours. The higher the percentage of fat in the mixture, the longer the intervals must be. There are infants who thrive best when fats are low and proteins and carbohydrates high, and vice versa, but the great majority do best on formulæ in which the fats and the proteins are in equal proportions. Because of the deficiency of amino-acids in cows' milk the artificially-fed infant requires more total protein than one who is breast-fed. No infant can thrive unless it receives about one-sixth of an ounce of carbohydrate to every pound of its body-weight. It has been found that a young infant requires about $2\frac{1}{2}$ to 3 oz. of water to every pound of body-weight for the first six months, and about 2 to $2\frac{1}{2}$ oz. for the second six months. The smaller the infant for its age and the less it weighs, the greater is the need for water.

Too much fat causes constipation, convulsions, ammoniacal urine, acidosis; *too much sugar*, diarrhœa, intoxication, œdema, fever; *too much protein*, fever, leucocytosis, prostration; *too much salts*, intoxication, fever, and œdema; *too much water*, increased loss of protein and salts.

From ten years' study he concludes that the majority of healthy infants do better and are less prone to disease when dilutions of whole milk are used than when given dilutions of top milk. Infants who suffer from fat intolerance should be put on mixtures containing skim milk; those with sugar intolerance, on top-milk mixtures or protein milk. Infants who are very much under weight and present no intestinal symptoms should be put on skim milk with a high percentage of carbohydrates, thus giving a low proportion of the least digestible element—fat.

About 90 per cent of all infants do well on whole-milk dilutions; in about 7 per cent it is necessary to use skim-milk mixtures, and in about 3 per cent top-milk mixtures. Intolerance for milk as a whole or for any of its elements is the least common cause for malnutrition. For every such case there are ten due to over- or under-feeding, irregular feeding, and improper technique or method of preparation. Of the intolerances, that of fat is most frequent (70 per cent), that of sugar is 20 per cent, and that of protein only 10 per cent.

The best diluent is *boiled water*; there is no need to add adjuvants such as cereal diluents or alkali as a routine. Of the sugars, he uses a **Dextrin-Maltose** preparation in every case, unless there is some contra-indication. His custom is to add one level tablespoonful of the sugar to every 10 oz. of the mixture. Dextrin-maltose is not well borne by infants under two months of age, and is contra-indicated if there is a tendency to constipation or vomiting. The more maltose the preparation contains, the more laxative it is. Lactose seems to

be the most laxative of the sugars, and the two have often been combined with advantage. Dextrin-maltose produces the greatest gain in weight, cane sugar less, and lactose least. Each variety tends ultimately to produce constipation, which is often relieved by a change from one sugar to another. Lactose has the least, and maltose the greatest, tendency to produce vomiting. Lactose is the most, and dry dextrin-maltose preparations are the least, laxative of the sugars.

The diet should not be changed too frequently, and never without definite reason. *Fruit-juices* should be given early—from two to three months of age—if pasteurized or boiled milk is used. *Beef-juice* or finely-mashed *yolk of hard-boiled egg*, rubbed through a sieve and mixed with milk in a spoon or put into the mixture, is ordered at six to seven months: earlier if the infant is anæmic. At nine months *brot'is* can be given. After the sixth month two or three *milk or arrowroot biscuits* should be given in the day.

H. C. Cameron[2] calls attention to a defect in the infant which, in his opinion, is a not uncommon cause of failure to nurse successfully—inhibition of the sucking reflex by the infant's nervous unrest and excessive emotional display. Sucking is a reflex act, and fails to appear if the child is too somnolent or inert. It also fails if inhibited by extreme emotional excitement. The normal child spends almost all the first twenty-four hours in deep sleep until aroused by the advent of hunger. The baby whose nerves are on edge, and who shows it by incessant angry crying and restless movement, is likely to suffer much earlier as well as much more severely from the sensation of hunger. If, when put to the breast, he sucks strongly, and the milk appears early, all is well. Too often, unfortunately, this is not the result. Crying, spluttering, and gulping, the child mouths and bites at the nipple without fastening on, or, throwing back his head, continues to struggle without taking any notice of the proffered breast. Hunger adds to the unrest, and unrest to the hunger, until everyone is tired out and artificial feeding is begun.

Fortunately, it is a condition which is comparatively amenable to treatment. A good deal can be done by simple measures—the half-darkened room, a warm soft bed, and absolute quiet. The infant should be handled as little as possible, and always lifted steadily and gently. Dandling, patting on the back, and expostulating or talking with him, only make matters worse. If by such simple measures a few days' sound sleep can be procured, our difficulties are at an end. In these particular infants, too strict adherence to a rigid scheme and time-table is unsuitable: our only chance of success is to be active in seizing every reasonable opportunity which presents itself, having regard to rational time limits, to get the child to the breast while he is asleep. If opportunities for feeding the child are not sufficient, it is not difficult to increase their number. For this purpose **Chloral Hydrate** is peculiarly suitable, and its effect more marked, more certain, and more immediate than that of potassium bromide. It should be given twenty minutes before the intended meal-time,

One grain dissolved in a teaspoonful of water with a little syrup of orange is usually enough for a very young infant. He has sometimes had to adopt this method before each of five or six meals in the day, but, as a rule, 3 gr. in twenty-four hours are sufficient.

The *Nervous Dyspepsia of infants* is similarly controlled more efficiently by chloral than by any other drug. The children are often of a distinctly neurotic inheritance: thin and meagre, but, in contrast to what is usually found in primary dyspepsia, their muscular tone is often excessive. The limbs are a little rigid, the abdomen is often retracted, and their movements are strong, powerful, and active. They cry almost incessantly. If fed after crying, digestion appears to be a painful process. Regurgitation of food, sometimes explosively, is common. Without diarrhœa (the stools being normal) the bowels are often open eight to ten times in the day. The taking of food is often followed by an evacuation of the bowel. The usual treatment of dyspepsia is useless, and limitation of food actually harmful, for the nervous unrest is increased by hunger. As a rule the symptoms yield to suitable doses of **Chloral** and **Bromide.**

Fat Dyspepsia.—T. S. Southworth[3] points out that incapacity to digest the fat of cow's milk is not always a temporary one which may be overcome by careful feeding, but is, in some instances, an inherent characteristic of late years. Pædiatricians have found that older children suffering from nutritional disturbances were benefited only when the quantity of milk was reduced, when it was skimmed, or when it was entirely withdrawn from the dietary. In Southworth's opinion, these children would have been found to have suffered from fat dyspepsia at some time during infancy if their histories had been known. In such cases it is a mistake to aim at getting the infants back to a diet of milk with its full quantum of fat; more success attends continuing to feed with partially skimmed milk, limiting its amount in order that the total fat does not exceed that with which they are capable of dealing. Even diluted milk, if given in strong mixtures, can carry with it sufficient fat to overtax the infant's capacity, and so also, in the case of susceptible infants, may partially skimmed milk. If skimmed milk were more persevered with in such cases, the progress of the children would be more normal, and the skimmed milk, itself a valuable food, could be retained in the dietary. Nor would it be so often necessary to eliminate milk altogether from the food of older children because of protracted subacute digestive disorders. Associated with the disturbances are a characteristic lack of appetite and a distaste for many ordinary wholesome articles of food. Often they are wrongly allowed butter freely, to improve their nutrition, but suffer from a hydrocarbon satiety comparable with the carbohydrate satiety of children who have been allowed an excess of sucrose.

The same disturbance may sometimes be recognized in children not specially predisposed to it, but who habitually drink very large quantities of milk daily, or a considerable amount of milk with a high

content of fat like that from herds of Jersey, Guernsey, or Alderney cows. In such cases a reduction of the milk or removal of some of the cream may bring about improvement. He has recognized a familial tendency to this condition of incapacity for dealing with fats, by observing successive children of the same family, and by this recognition has been able to manage the diet of the younger members more successfully.

H. B. Gladstone[4] has been giving large quantities of **Fruit-juice** without other food to atrophic babies. "The immediate effect was surprisingly good," but it was found to be useless to expect permanent benefit unless a digestible milk diet was quickly introduced as well. If it were continued alone for more than a day or two, signs of loss of heat and collapse set in, as might be expected, since its nutritive value is no more than saccharine barley-water, and, according to Gladstone, it contains about 10 per cent of carbohydrate, 1 to 2 per cent of citric acid, and neither protein nor fat. The other bad result of too prolonged sole use of fruit-juice was a superficial ulceration of the mucous membrane of the mouth, quickly remedied by an alkaline lotion. He concludes that as much as a pint of fruit-juice can be taken daily with immediate benefit by a dyspeptic atrophic infant under one or two years of age. A carefully selected predigested food, low in albumin and fat and high in sugar, will then be both digested and absorbed, and result in gain in weight. At first a loss of weight occurs, but by the end of the first week this is usually regained; unless, however, the juice is followed by a diet scientifically adapted to the infant, it does no permanent good. He ascribes the good effect of the juice partly to its acidity rendering the bowel unsuitable for germs growing in an alkaline medium. He regards it also as exhibiting a tonic cleansing effect on the mucous membrane, and acting as a diuretic, diaphoretic, and alterative.

While oranges were available he used two parts of orange-juice to one of apple-juice, diluted with one quarter of the quantity of water. Then melon- and apple-juice were used, with slightly less benefit. Strawberry-, cherry-, raspberry-, and banana-juices were also employed, and were enjoyed by the babies without ill effects, and he thinks it probable that any available fruit-juice would succeed, provided that the acid fruits were not used in too large a proportion. Instead of the orange-juice, that of lemons may be added in small quantities to the sweeter kinds to provide the necessary acidity.

Marfan[5] rightly insists that condensed milk should never be allowed as a regular diet, but that both **Condensed** and **Dried Milks** are valuable in emergencies to supplement the regular diet for a short time, or as a temporary measure during the summer heat when good fresh milk is not procurable. He thinks that condensed skimmed and sweetened milk keeps better than condensed whole milk, and is digested more readily by the infant, especially if it suffers from digestive disorders. Similarly, he recommends desiccated milk for

normal babies only when good fresh milk cannot be obtained, and has had encouraging results with milk powder made with half its fat. He has found it useful when the infant's condition calls for a concentrated food of small volume, or a food poor in fat, or one in which the albuminoid substances have been made more digestible. He suggests that it may also be given a trial in habitual vomiting with infants who cannot obtain breast milk.

For the ordinary *diarrhœa* of bottle-fed babies under the age of three or four, he prefers **Buttermilk**, but considers desiccated milk to be the next choice. With choleraic diarrhœa the two have given equally good results. When an actual intolerance for cow's milk is met with, condensed milk, desiccated milk, or buttermilk may be indicated. By giving the milk powder at first in small amounts and rapidly increasing them, an anti-anaphylaxis may be developed. When an infant fails to thrive, it may be well to try different foods, changing from desiccated to condensed milk, buttermilk, etc., leading up to a return to fresh milk. For simple diarrhœa in infants over four he prefers **Malted Soups**, made at first with water and afterwards with increasing amounts of milk. For infants with athrepsia, breast milk is the only salvation, but it usually comes too late.

B. R. Hoobler[6] makes a plea for the more rational preparation and use of **Malt Soup.** Not only has it been used extensively for enteritis, as advocated by Keller, but it has also been given for other conditions with only varying success. According to Hoobler, this is to be ascribed to a close adherence to the original directions which are usually printed on the container in which the malt-soup extract is sold. He has found it more satisfactory to employ a method which consists in adding the malt-soup extract to a well-cooked cereal-water, and adding this mixture to raw milk in such proportions as are desired.

According to Ladd,[7] the proportion of volatile fatty acids in breast milk is 2·5 per cent, as compared with 27 per cent in cow's milk. In both, the non-volatile fats consist chiefly of olein and palmitin. Since olive oil is almost wholly olein and palmitin, Ladd has utilized it to obtain the fat percentage in modified milk mixtures, thus eliminating the volatile fatty acids, and by homogenization has also obtained an emulsion as fine as, or finer than, that of human milk.

The Diet of Young Children.—J. H. Mason Knox[8] refers to the table of food requirements of children per kilo of body weight drawn up by Camerer (*Table I*), and to similar investigations made by Hassa, Herbst, Steffin, and Uffelman, and tabulated by Locke. These tables bring out several important facts which must be borne in mind for the successful feeding of children: first, the actual amount of food required by growing children increases gradually to maturity; secondly, the relative quantity of food in proportion to the body weight decreases almost as regularly from infancy to maturity, i.e., the amount of food and the number of heat units per kilo or pound is greater the younger the child.

Table I.—Food Requirement for Children per kilo of Body Weight.

Age, years	Sex	Protein, grms.	Fat, grms.	Carbohydrate, grms.	Calories
2 to 4 ..	Each	3·6	3·1	9·2	75·0
5 to 7 ..	Girls	3	1·9	10·7	69·0
	Boys	3·5	2·5	10·9	76·6
7 to 10 ..	Girls	2·7	1·3	9·9	39·2
	Boys	2·8	1·3	10·4	61·6

Table II.—Food Requirement Determined by Several Authors, combined by Locke.

Age, years	Calories, per kilo	Calories, per lb.
2 ..	94	42
4 ..	82	37
8 ..	67	30

The quantity of water required varies within large limits. A litre or quart should be the minimum fluid intake daily at two years, according to Camerer, and this amount should be increased to about 3 pints for a child of seven. Salts are also essential, but in a well-assorted diet they need not be calculated with these fundamental needs of the child in mind; the physician should add to the exclusive milk diet of early infancy in such a manner as to provide a balanced ration and one readily digested.

References.—[1]*Med. Rec.* 1917, ii, 181; [2]*Lancet*, 1917, ii, 345; [3]*Jour. Amer. Med. Assoc.* 1917, ii, 516; [4]*Pract.* 1916, ii. 472; [5]*Le Nourrisson*, Paris, v, No. 1, p. 1 (abstr. *Jour. Amer. Med. Assoc.* 1917, i, 1668); [6]*Ibid.* 1916, ii, 1420; [7]*Arch. Pedriatr.* 1916, July (abstr. *Ther. Gaz.* 1916, Dec., 793); [8]*Jour. Amer. Med. Assoc.* 1916, ii, 432.

INFANTILE PARALYSIS. (*See* Poliomyelitis, Acute.)

INFANTILE SCURVY. (*See* Scurvy, Infantile.)

INFLUENZA. *E. W. Goodall, M.D.*

In a paper on the clinical types of influenza, N. E. Brill[1] draws attention to certain rare atypical modes of onset of this disease. "They are more common to the influenza which shows an early involvement of the nervous system, than to the others. . . . (1) The infection may be ushered in by unconsciousness, which may last for hours, and there may be only a slight elevation of temperature. After regaining control of his mental faculties, the patient may show

a slight or pronounced form of respiratory disease. (2) The infection may begin with a definite psychosis, such as an attack of maniacal excitement or a confusional stupor, either of which may obscure the nature of the original disease; when this condition is replaced by the usual signs of respiratory involvement, the diagnosis may be readily made. (3) Onset may show signs of gastro-intestinal disturbances, accompanied by frequent vomiting, diarrhœa with numerous watery and occasionally hæmorrhagic stools, extensive abdominal tympany, with rigidity of the abdominal wall and excessive abdominal pains, being signs similar to those of an acute peritonitis. Stormy as this onset may be, the infection may last only two or three days, with slight fever, with or without signs of respiratory involvement, whereupon convalescence may be established."

An unusual form of influenza which Brill has met with is that in which the heart is affected early—a primary influenzal endocarditis or pericarditis. It is a very rare form, and has hardly been noticed by writers on this disease. It is essentially subacute or chronic in its course, and is always accompanied by a bacteriæmia, the influenza bacillus being found in the blood in pure culture, and in the vegetations on the damaged heart valves after death. It is prone to occur in persons in whom the heart has been damaged by some previous disease. Petechiæ and small raised erythematous swellings occur in the skin, painful to the touch. Brill met with one case in which one of the small swellings broke down and left a small ulcer. In influenzal endocarditis the kidneys are not involved, a feature distinguishing this variety of infective endocarditis from others.

According to S. A. Brown,[2] influenza is very distinctly a mixed infection, and the Pfeiffer bacillus may play a minor part in many cases.

References.—[1]*N. Y. Med. Jour.* 1917, March, 530; [2]*Ibid.* 536.

INSANITY. (*See* Mental Diseases.)

INTERNAL SECRETIONS IN EAR, NOSE, AND THROAT AFFECTIONS.

J. S. Fraser, M.B., F.R.C.S.

Pollock[1] holds that we shall not be able to put our treatment of glandular disturbances on a rational basis until the physiological chemists can definitely tell us by examination of the blood and the various excretions or secretions, whether there is a deficiency or an over-production of the internal secretions. In perfect health all the ductless glands must work in harmony. When one or the other is working excessively or not secreting sufficiently, the glands are thrown out of harmony, i.e., they must undertake to supply the deficiency, or an antagonistic gland will secrete excessively, since the inhibitory influence of the affected gland has been removed. We know that the suprarenal and the hypophysis act as a check upon the thyroids, and vice versa. When the suprarenal is destroyed or secretes too little, the hypophysis often hypertrophies and attempts to replace it in the economy.

The Thymus.—Basch, experimenting upon dogs, discovered that this gland continued to develop for four weeks after birth and then rapidly retrograded. (In the human subject the retrogression goes on to puberty.) If the dog's thymus was removed previous to the fourth week, marked developmental changes took place, mostly in the bony structures. The bones became soft and weak, and the animals could not stand. This condition corresponded strikingly with rickets in children. Extirpation of the thymus also heightened the irritability of the nervous system. Intravenous injections of thymus extract depress the heart action, slow the pulse, and produce a fall in blood-pressure. At the post-mortem there is always a clot in the right ventricle. If, however, hirudin was first injected, an otherwise lethal dose of thymus could be given, as this drug prevented clotting. Pollock suggests that the administration of **Hirudin** will prevent deaths under anæsthesia in cases of status lymphaticus.

The Suprarenals.—The main secretion of these glands comes from the medulla, from which the extract is obtained. Experimental removal of the gland produces progressive muscular weakness, cardio-vascular asthenia, and frequently pigmentation of the skin. The first effect of an injection of adrenalin is a rise of blood-pressure, due to a constrictor action on the walls of the vessels themselves. This action is of short duration, and is very often succeeded by dilatation and a fall in blood-pressure. Long-continued injections cause necrosis of the middle coats of the arteries and a deposit of lime salts (arteriosclerosis). Bossi found experimentally that in sheep in which one gland was removed, symptoms of osteomalacia resulted in a few days. Bossi has treated cases of osteomalacia with **Adrenalin** injections, and found that the patients recovered completely. Pollock asks why, if it can cure osteomalacia, it cannot cure otosclerosis.

The Hypophysis.—The posterior lobe (nervous) furnishes the principal therapeutic extracts, the action of which is very similar to that of adrenalin. The hypophysis extract, however, acts longer and can be used indefinitely. Acromegaly is caused by a hypersecretion, but not necessarily an enlargement of the gland. Hochenegg cited the first case of acromegaly in which the hypophysis was removed by the nasal route. There followed a diminution in size of the hands and feet, with complete recovery in three months. The condition of hyposecretion was first described by Froelich, and called 'dystrophia adiposo genitalis.'

Pollock reports a case of tumour of the hypophysis operated upon by the antro-post-ethmo-sphenoidal route. Male, age 23; gradual onset of blindness for six months; no headaches. Nasal examination showed nasal turgescence. *X* rays showed flattening out of the sella and disappearance of the posterior clinoid process. A soft tumour mass was felt, but was not removed. The patient made an uneventful recovery, but "too short a space of time has elapsed to expect any great amount of improvement in his symptoms."

Beck[2] considers the thyroid, thymus, hypophysis, and adrenals in

their relation to otolaryngology. The hypophysis and adrenals are known to have a specific influence on the growth of bone, while the thymus influences the nutrition of bone. In *atrophic rhinitis* there is a chronic focus of infection in the intestine, tonsil, teeth, nasal sinuses, etc. This focal infection produces changes in some of the glands of internal secretion and disturbs their harmonic action. This results in rarefaction of the bony framework of the nose, and is followed by a secondary degenerative change in the mucous membrane, with metaplasia of the epithelium. Finally, we have a low-grade infection by a great variety of organisms, among which we find the so-called specific fœtid bacillus of ozæna. Beck treats his patients with glandular extract by mouth or hypodermically for a period of one to six months, and after a time repeats the treatment. He finds that in some cases he obtains striking results.

Hyperplastic Ethmoiditis or Non-suppurative Sinusitis.—Beck believes that non-suppurative sinusitis is invariably associated with cases of so-called bronchial asthma. Nasal polypi are always present in the later stages. He holds that these conditions are due to a hyposecretion or disharmony of the endocrine glands, and that the underlying cause is a focal infection—most frequently from the intestinal tract. These patients are sensitized particularly to protein or albumin, and their attacks are a true anaphylaxis. The treatment consists in removing the original cause—the focus of infection—and the administration of glandular extract. The middle turbinal and ethmoid must also be attended to. Beck states that permanent cure cannot be obtained by operative procedures alone.

Otosclerosis.—Beck has been struck by the similarity of the spongification in otosclerosis to that seen in osteomalacia, arthritis deformans, and in the bones in early pregnancy. He treats otosclerosis by means of **Adrenalin** for the most part, but in many cases he combines it with extract of the **Thymus** and **Pituitary.** He does not claim to have cured a case or even to have improved the hearing, but he does claim to arrest the progress. He gives injections of from 1 to 15 min. in gradually increasing doses. The treatment is carried out every second or third day for a period of six weeks to three months, and is controlled by measurement of the blood-pressure. Treatment is then interrupted for the same period, then resumed for the same period, and then stopped.

References.—[1]*Laryngoscope*, 1917, May, 430; [2]*Ibid.* 422.

INTESTINAL STASIS. (*See* Constipation.)

INTESTINAL SURGERY. *E. Wyllys Andrews, M.D., F.A.C.S.* (*Chicago*).

The subject of diverticulitis has been put on a better clinical basis during the last year. Drummond[1] has made studies as to the etiology, and has arrived at the following conclusions: (1) Sacculi of the large intestine are multiple, they only occur in old people, and are acquired. (2) They are probably due to a general deficiency of the non-striated

PLATE XXII.

SACCULI OF THE LARGE INTESTINE

Interior of the pelvic colon laid open through the antimesenteric border, to show the common site of sacculi—appearing at a point where the vessels perforate the muscle tissue and come to lie under the mucous membrane.

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muscle-tissue of the individual, as is shown by their tendency to occur in various viscera of the same individual. Chronic venous congestion and intestinal obstruction are not of prime importance in their etiology. (3) Sacculi may occur in any portion of the colon, but the pelvic colon is by far the most common site. (4) Sacculi make their appearance almost invariably at one point in the colon wall, viz., between the mesentery and lateral longitudinal muscular bands. After piercing the muscle coat they follow the sheaths of the vessels towards the mesentery. They never open primarily into the leaves of the mesentery, as do sacculi of the small intestine. (5) The blood-vessels of the normal colon may be said to predispose to sacculi to the same extent as the spermatic cord does to an inguinal hernia. (See *Plate XXII.*)

Telling and Gruner[2] and W. J. Mayo[3] report long series of cases. Diverticula of the colon are very common in old age, and usually cause no trouble. Diseased conditions arise from fæcal concretions and narrowing of the outlet causing infection or irritation. Mayo defines four groups.

1. *Self-limiting diverticulitis*, the result of acute infection of one or more of the sacs. The symptoms resemble those of appendicitis accompanied by tumefaction, usually on the left side. The swelling and pain usually subside spontaneously. Patients often give a history of numerous similar attacks previously. Operation is not indicated except in the very severe or frequently recurring debilitating attacks. Excision of the entire diverticula-bearing portion of the colon is the only cure.

2. *Attacks producing abscess*, resulting in fæcal fistula. The fistula may be external or into the bladder or vagina. Excision of the entire tract and of the offending portion of the colon is the treatment.

3. *Obstruction.*—This is an interesting type, due to the chronic hyperplastic changes and fibrosis. Masses are formed in and about the bowel which cannot be distinguished from carcinoma, except microscopically. Ileosigmoidostomy or colostomy followed by resection is the safer method. Patients are generally too debilitated to stand the resection without preliminary building up.

4. *Carcinoma.*—Thirty-one per cent of Mayo's cases had developed carcinoma on pre-existing diverticula, a very unusual example of carcinoma caused by chronic irritation.

Colostomy.—Lockhart-Mummery,[4 5] is an advocate of transverse colostomy in certain cases. Many temporary colostomies have been necessitated by war wounds of the lower bowel and rectum. A stoma made in the transverse colon as near the splenic flexure as possible has several advantages. It is easier to close, the bowel being freer. There is less tendency for the mucosa to protrude in the upper abdomen. Control is vastly better. The 'U'-shaped transverse colon makes a sac, and the exit is near its highest point instead of low down as in the other colostomies. The stools are no longer liquid at this point, most of the absorption of water being done by the right colon normally.

Shaw and Hunt[6] have described an interesting point in technique by which the opening of the bowel for colostomy can be postponed for twelve to thirty-six hours after the peritoneum is sealed off. A strip of bowel is clamped off with guttapercha tissue included in the clamp. It is then cut off flush with the clamp

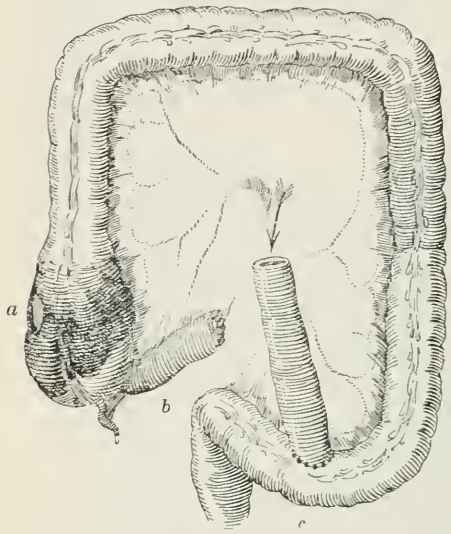


Fig. 32.

Fig. 32.—Illustrating the condition after operation for exclusion of the cæcal growth. *a*, Opening into centre of growth; *b*, Lower end of ileum divided and closed; *c*, Anastomosis of upper end of ileum to middle of sigmoid.

and carbolized. The whole is then inverted with a Kerr running stitch, leaving the guttapercha to prevent union. After about twenty-four hours the suture and guttapercha are pulled out, opening the stoma.

As regards the surgical treatment of chronic intestinal stasis and allied conditions, its usefulness is certainly confined to a very narrow field. Careful selection of cases which have failed under expert management is vital. All operations of exclusion or short-circuiting have proved worse than useless. The absorbing surface is not removed, and the stasis in the blind loop is increased. The accompanying illustrations (*Figs.* 32, 33) from a paper by Grey

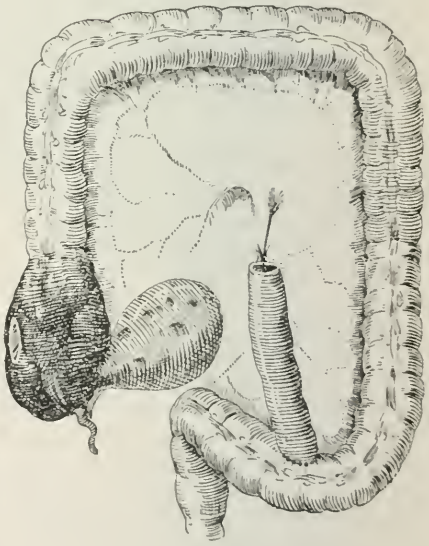


Fig. 33.

Fig. 33.—Illustrating the condition in the same case as *Fig.* 32, as found at a third operation. The lower end of the ileum is enormously distended as the result of obstruction, its walls are thickened from inflammation, and there are numerous areas on the point of perforation.

(*Figs.* 32, 33 *by kind permission of the* '*British Journal of Surgery*.')

Turner[7] on the dangers of intestinal exclusion show a happening which is unfortunately very common. Appendicostomy is insufficient, and colectomy too dangerous. C. H. Mayo[8] advises right colectomy, as it removes the absorbing surface of the colon, but warns that the lower ileum will vicariously undertake this function. Bottomley[9] reports ten cases operated for chronic arthritis with only one cure, and this has been the experience of most surgeons with such cases.

References.—[1]*Brit. Jour. Surg.* 1917, Jan., 407; [2]*Ibid.* 468; [3]*Jour. Amer. Med. Assoc.* 1917, June; [4]*Pract.* 1917, Aug., 101; [5]*Brit. Med. Jour.* 1917, i, 685; [6]*Ann. Surg.* 1917, Jan., 105; [7]*Brit. Jour. Surg.* 1916, Oct., 227; [8]*Jour. Amer. Med. Assoc.* 1916, ii, 779; [9]*Ibid.*, 783.

IODISM.

Adrenalin of value in cases of (p. 2).

JAKSCH'S (VON) ANÆMIA. (*See* Splenic Anæmia.)

JAUNDICE, HÆMOLYTIC. *Herbert French, M.D., F.R.C.P.*

Additional cases illustrating the benefit of **Splenectomy** in hæmolytic jaundice have been published during the year. The cure that results has still to be subjected to the test of time, but the immediate results of the operation, and the apparent prognosis after it so far, seem excellent. At the present time it appears to be *the* treatment to advocate in these cases, especially in the congenital or hereditary type. C. H. Peck[1] records 3 fresh cases, and H. Z. Giffin[2] reviews 12 more. It is noteworthy that in 7 of these gall-stones were present, and it might be thought that removal of these should have been the treatment rather than splenectomy. Giffin points out, however, that in cases of hæmolytic jaundice removal of stones has not cured the jaundice, whereas, on the other hand, patients with hæmolytic jaundice, who have been splenectomized, have been cured of their jaundice and anæmia though retaining their gall-stones.

References.—[1]*Jour. Amer. Med. Assoc.* 1916, ii, 788; [2]*Surg. Gyn. and Obst.* 1917, ii, 152.

JAUNDICE, INFECTIVE. *Sir Leonard Rogers, M.D., F.R.C.P.*

This, often called Weil's disease, has been claimed by Japanese workers to be caused by a spirochæte, and their discovery has now been confirmed, and the disease studied on the Western front in France and in other places. Bertram Dawson, W. E. Hume, and Bedson,[1, 2] record careful studies of the disease, illustrated by coloured plates. They divide their cases into severe and mild, although all grades occur. The onset, with fever, is more often gradual than sudden; jaundice appears from the second to the seventh day. Tenderness of the upper abdomen and the enlarged liver, sickness with the onset, a curious purplish discoloration of the body, hæmorrhages from the nose, lungs, and gastro-intestinal mucous membranes, deeply bile-stained urine, and initial fever, followed by a remission for several days and a secondary rise, are the main symptoms. The

leucocytes are increased to the extent of a slight leucocytosis with a relative increase of the polynuclears. In the mild cases the symptoms may all be less marked, and the secondary rise of fever is often absent. Pathologically, spirochætes are found in the urine, and after death intense congestion of the duodenum may be present, but there are few changes in the liver, in which the spirochætes may be demonstrated. The spirochæte is only found in the blood during the first seven days, and in very small numbers, so it is difficult to demonstrate there. By inoculating the patient's blood or urine into guinea-pigs the disease is produced and the organism can be found, which is the most certain diagnostic test. From the ninth day the organism can also be detected in the urine after centrifuging. It has been named the *Spirochæta icterohæmorrhagica* by Inada, who discovered it.[3]

A. Stokes, J. A. Ryle, and W. H. Tytler[4, 5] deal with the disease in Flanders, where they have confirmed most of the Japanese workers' statements regarding it, their work being based on a study of one hundred cases. They agree with the above description of the disease, and lay stress on the frequency of hæmorrhagic herpes labialis and albuminuria, and give the incubation period in a case of accidental infection as six to eight days. They infected guinea-pigs, and found the spirochæte in them, especially in the liver, but failed to cultivate it. They studied lice, but do not think they carry the infection. They point out the relationship between wet weather and damp trenches and the disease.

C. J. Martin[6] deals with the disease as seen in Gallipoli, and confirms finding the spirochæte in rats. The duodenal secretions did not yield any causative bacillus. The death-rate in Egypt is given by Kartulis as 30 per cent, although in France it was only 6 per cent. L. Martin and A. Pettit[7] deal with the work of the Japanese investigators, giving a good summary of it. L. Wilmaers and E. Renaux[8] deal with forty-seven cases seen in France. They tried quinine without any effect. M. Garnier[9] lays stress on the recurrent nature of the fever. The disease has also been met with in Italy by C. Moreschi[10] and other workers.

References.—[1]*Quart. Jour. Med.* 1917, Jan., 90; [2]*Brit. Med. Jour.* 1917, ii, 345; [3]*Jour. Exper. Med.* 1916, March; [4]*Brit. Med. Jour.* 1916, ii, 413; [5]*Ibid.* 1917, i, 142; [6]*Ibid.* 445; [7]*Presse Méd.* 1916, Dec. 14, 569; [8]*Arch. Méd. Belges*, 1917, Feb., 115; [9]*Presse Méd.* 1916, Aug. 31, 381; [10]*Policlinico*, 1917, Feb. 25.

JAWS AND FACE, GUNSHOT INJURIES OF.

W. H. Dolamore, M.R.C.S., L.D.S.

Further experience with gunshot injuries of the jaws confirms the opinion that no separated portion of bone should be removed unless it be obviously dead. *Fig.* 34 shows a fracture of the mandible with a large separated piece of bone exposed in the floor of the mouth. It was questioned, when first seen, whether these should be removed; fortunately they were not: yet later, when the splint was taken off by a colleague in Dublin, he wrote doubting whether the bone had

PLATE XXIII.

GUNSHOT INJURIES OF THE JAW

Fig. 34.

Fig. 35.

Fig. 36.

Fig. 34.—Fracture of the mandible, with separated piece of bone projecting into floor of the mouth. *Fig.* 35.—Anatomical peculiarities of callus in fractures of the symphysis of the mandible. Callus forming a second mandibular arch, due to production of bone in floor of mouth. Metallic debris. *Fig.* 36.—Agglomerated fragments on the posterior surface of callus on floor of mouth.

By permission from the 'Dental Record.'

PLATE XXIV.

CORRECTION OF MANDIBULAR FRACTURES BY THE GRADUAL PROCESS (NORMAN BENNETT'S CASE)

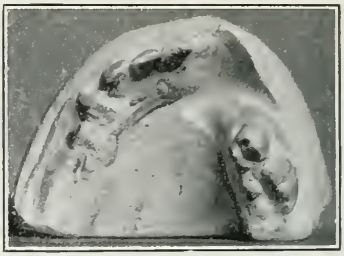


Fig. 37.

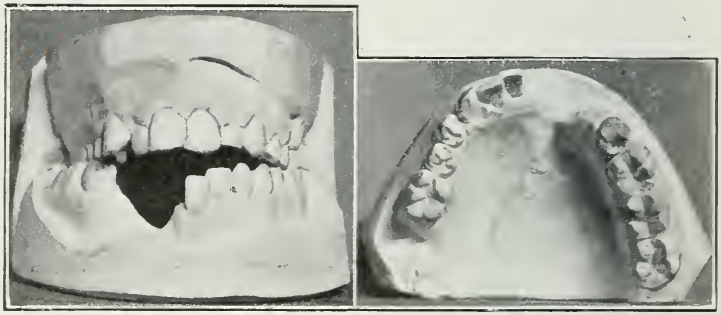


Fig. 38.

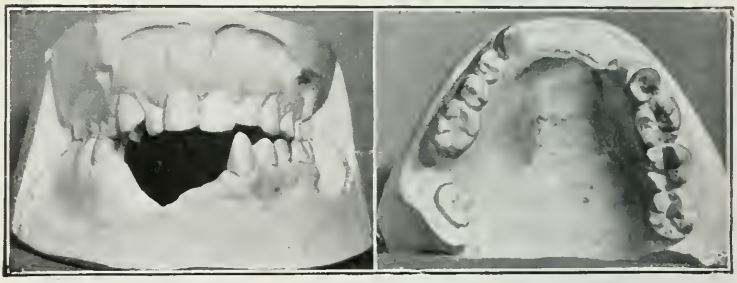


Fig. 39.

Fig. 40.

Fig. 41.

By kind permission of the 'Practitioner'

ever been fractured. The power of comminuted particles to generate fresh bone tissue is remarkable, so that hope of union should not be abandoned until the mandible has been immobilized for a considerable time.

Gérard Maurel[1] calls attention to some anatomical peculiarities in callus seen in two such cases. In the first (*Fig.* 35)—a medial fracture of the mandible with loss of three incisors—the callus formed was solid, and projected on the labial surface more than a centimetre beyond the dental arch to the right of the mid-line. Lingually the callus projected nearly four centimetres, and occupied all the anterior portion of the floor of the mouth, the mucous membrane of which it raised.

The fracture in the second case (*Fig.* 36) was also at the symphysis and due to shrapnel. There was mal-union, for which treatment was refused. An exostosis projected backwards for 3 cm. and occupied the floor of the mouth, raising the mucous membrane. A rounded projection was prolonged backwards from this for a further 18 mm.

Maurel considers these masses are more likely in young patients, and are favoured by comminution and dissemination of osteoperiostitic tissue. Large and small splinters of bone are seen in the mass. These may have been displaced at the time of injury, or may have become subsequently detached and then displaced, very possibly by contraction of the muscular fibres of the genioglossus. He has seen such splinters cause bony union in cases of pseudo-arthrosis, if the bone be immobilized.

It is possible that it is the presence of these disseminated particles which, in certain cases of fibrous union with displacement, assists in the formation of callus, when either the fibrous tissue is divided and the mandibular fragments are fixed in their correct position, or the correction is brought about slowly by mechanical appliances. Norman Bennett[2] prefers the latter method, and regards it as probable that by allowing callus to form with the ends of the bone approximating, and then stretching the callus during bone-formation, union by new bone is more likely to be induced across a considerable gap, than if the two ends are immediately separated; though when only about half an inch of bone is lost and the injury is recent, he suggests immediate methods may be adopted. It must be admitted that there seems a fundamental difference between these gunshot injuries and those seen in civil practice, since, in the latter, bony union is, at least, unlikely across a gap of half an inch.

Fig. 37 illustrates one of Bennett's cases, showing the condition of a mandible about two months after injury. The two portions of the mandible had been allowed to approximate and unite by tolerably firm fibrous union. The patient could only open the mouth to a very small extent, and it was very difficult to obtain any impression of his mouth. *Fig.* 38 shows the condition eight months later, after division and gradual expansion. *Fig.* 40 shows that bone is commencing to unite the fractured ends at the lower border. *Fig.* 39 shows the condition nine months after *Fig.* 38. Two teeth have been extracted,

the downward displacement on the left side has been corrected by means of a skull and chin-cap, and by grinding, and the bone is completely consolidated (*see Fig.* 41).

When in a case of malplacement of fragments of the mandible there is firm bony union, if it be essential and advisable to correct the deformity, Pierre Sébileau[3] performs osteotomy. In these cases, he says, the tongue is often bound down by adhesions and cannot be protruded. The lips and jaws are fixed by cicatricial bands, and the tongue falls backward. He performs laryngotomy and plugs the pharynx. He makes an incision along the lower border of mandible, perforates the floor of mouth with Kocher's forceps, and draws in a Gigli saw. Through this incision the sulcus between lip and gum is divided, and a vaginal retractor introduced to protect the lip. When the bone is divided and the deformity reduced, a splint is fixed. During the time he had directed the Chaptal Service to the end of 1916, he had performed 25 unilateral and 5 bilateral osteotomies. Two died three months later of bronchopneumonia. At the time of writing he had obtained a definite result in 21 cases. One patient removed the splint some days after the operation. The others he groups as follows: (1) 5 with non-comminuted fracture; of these, 2 have good anatomical and functional union, and 3 slight mobility. (2) 7 very comminuted fractures; of these, 1 had good anatomical and functional union, 1 slight mobility, 3 appreciable mobility, and 2 were freely movable. (3) These include 2 who since had bone-grafts inserted, and 7 with firm fibrous union but with mobility.

Pseudo-arthrosis of the Mandible.

The treatment of this condition remains one of the difficulties of jaw surgery. There is no doubt that many cases are due to initial delay in immobilizing the bone fragments. Thus, apart from other ill results, this points clearly to the unwisdom of such neglect. In old cases, when the soft tissues have healed and the wound is no longer septic, success is said to have been attained, if there be no loss of tissue, by cutting down to the bone but without opening the buccal cavity, paring its ends, and wiring them together. These results have not so far been published. Lindemann[4] tried this in 23 cases with only 4 successes; therefore he and others prefer to insert bone-grafts. When there is loss of substance, and especially when the approximation of the ends is impossible, the use of bone-grafts is the only hope of cure. There are more serious conditions, but few are followed by more continual discomfort, combined with personal disfigurement, than the loss of a large portion of the mandible. The use of prosthetic appliances may do much to alleviate the condition, especially when teeth remain implanted in the two or more remaining portions of bone; but this is only an alleviation, not a cure; hence the importance of the matter. Moreover, when the teeth are ultimately lost and the appliances cannot be worn, the condition must be aggravated.

Bone-grafts.—Very different views are held with regard to the ultimate success of the use of bone-grafts in treating pseudo-arthrosis of the mandible. It is admitted the end-results cannot be known till a long period has elapsed. It has been observed by Lindemann and others that even when an aseptic primary union of the wound follows the operation, even when the graft unites with the mother bone, as tested by immobility and seen in skiagrams, nevertheless in some cases absorption sets in later and the graft disappears. Hence Sébileau's[3] remark, "The question of bone-grafting is still full of doubt. It can only be settled by publication of exact notes and of actual statistics. Nothing is worse from a scientific point of view than hasty presentations of isolated successes, which are often temporary."

At home successful cases have been seen and heard of, and, per contra, many failures, especially among operations done by those whose experience in this particular matter cannot be described as large. In the absence of details and statistics of home work, it appears to be important to attempt to summarize cases reported abroad. Of these, those published by Lindemann[4] at Düsseldorf undoubtedly correspond most nearly to Sébiliau's ideal. Some account of his technique was given in the MEDICAL ANNUAL last year, p. 312. In 1916 he had the opportunity of reviewing his work (115 bone-grafts) to that date, and as a consequence has modified his methods Up to that date the majority of the grafts were taken from the tibia, only a few being from the iliac crest, the ribs, or the mandible itself. The failures, in these cases, were due to lack of organization of the graft after primary union of the wound. Both by means of skiagrams, and by actual inspection of the graft after it was laid bare, it was proved to have undergone no change. It was enveloped by a firm, whitish layer of connective tissue, and but little callus was present, or none at all. Sometimes it showed absorption spaces with no corresponding development of osteoid tissue. In three cases this led to a new defect, and in three the graft was completely absorbed. Since there was primary union, Lindemann does not think this absorption can be looked upon as the result of inflammation. Periosteum was present in sufficient quantity, and usually that of the graft was sewn to that of the stump. It appears to him that the handling of the graft may have been the mistake. In four of the six cases the operation lasted two hours, chiefly occupied in giving the graft the necessary curvature, and, while doing so, the periosteum became detached and the finer canaliculi filled with bone dust. Such a graft must necessarily partake of the nature of a foreign body, and meet a like fate.

The fact that a piece of the tibia consists so largely of compact tissue led him to use grafts taken from the iliac crest, which is so richly supplied with medullary, bone-forming elements The following advantages are claimed: (1) The operation is shortened, since, the bone being already curved, time is saved in fashioning the graft; hence there is less chance of its getting cold and dry. (2) The patient

is saved the worry of anticipating a weakened leg, which is not wholly visionary, as Lindemann records three cases of fracture of the tibia following the operation. (3) Union with the mother bone follows more quickly, probably because of the greater amount of medullary tissue and because vascularization takes place more easily in this spongy bone than in the compact tissue of the tibia. (4) There is a greater formation of callus; hence the graft grows in thickness and strength. Even in successful cases this may not happen with the tibial grafts, and, apparently, rarely does so if a piece of rib be used. He had used such grafts in over 160 cases at the time of writing. His gross total was 282 cases.

Lindemann illustrates the different behaviour of a tibial and an iliac graft in *Figs.* 42 and 43. For a defect in the mandible a tibial graft 7·5 cm. long was inserted a year and three-quarters before. It consisted chiefly of compact tissue, and needed much filing to give it the required curvature, only a little periosteum remaining. The medial end quickly joined, but the distal end did not join to the ascending ramus; on the contrary, it was absorbed to the extent of 2 cm. An iliac graft was inserted a few weeks before the reproduced skiagram was taken. The tibial graft did not differ in appearance from that seen soon after the first operation, but the iliac graft had become fixed four weeks after the second operation, and already showed a mass of callus.

Klapp[5] gives the following directions for removing the graft from the iliac crest. An incision is made from the anterior superior iliac spine along the crest, extending to the size the graft is required. The top of the crest is free of muscular attachment, but the fibres of the gluteus maximus and medius on the outer side and the iliacus on the inner must be cut into somewhat in order to reach the bone. At the iliac spine the uppermost tendinous fibres of the sartorius and the tensor fasciæ latæ must be removed. The soft parts being held back, he now removes the graft, commencing at the anterior superior iliac spine. A chisel is driven in close under the spine from the front outwards; then a second chisel is driven from the front inwards below the crest. By this means the chisel is carried round the curve, the separated portion being held out of the way of the second chisel. Becker uses a keen-edged carpenter's chisel, Ganzer a Killian frontal-sinus chisel. The method was designed to avoid breaking the graft, though this is not likely on account of its elasticity, especially as the war patients are usually young. After completion of the grafting operation the divided glutei and iliacus are sutured. Regeneration of the bone is usually complete. He has never seen any functional disturbance, but there is an occasional exostosis of no importance. Soerensen,[6] when the patient is fat, inserts a small drain for a couple of days.

The graft itself is pliable, and easily shaped in a few minutes with a chisel. Being soft, it cannot be pointed as Lindemann advised with tibial grafts, but the mandibular ends can be, and these ends are

PLATE XXV.

GUNSHOT INJURIES OF THE JAW

Figs. 12 and 13.—Showing the different behaviour of a tibial and an iliac graft.

Redrawn from Skiagrams

placed in holes made in the graft. He regards it as an advantage to drill into the mandibular stumps to stimulate the medulla, but this is not a necessity. The advantages of iliac over other grafts seem to be confirmed by cases in which they have been used at home, since the receipt of these various papers.

Soerensen removes necrotic bone, but does not otherwise shape the ends. He then detaches the periosteum for about 1 to 1½ cm. The periosteum on the graft is left about 1 cm. wider and longer than the graft, and the fixation of the graft is made by inserting catgut sutures through the four corners of the periosteum of the grafts and of the mandible, and by sutures through the subcutaneous tissues and through the skin. This method shortens the operation and the time between the removal of the graft and its being placed in its bed.

Adolf Becker,[7] of Hanover, like Soerensen, cuts the periosteum 1 cm. larger than the graft, and has obtained astonishingly rapid ossificatoni when it has been possible to keep the graft in place without fixing sutures, but he has not hesitated to use them, of catgut or fine wire, when necessary. He does not point the end of the graft, believing that the time so spent lessens its viability.

Some surgeons adopt with success Albee's method of cutting a trough in both mandibular ends, in which trough the graft is placed and fixed with catgut sutures, and some have succeeded when the jaw and the graft are fixed by plates. Sébileau has fixed it as seems best with screws or silver wire, or simply enclosed it in the fibrous callus.

These operators warn against using a chisel to shape the mandibular ends. The splint, on which the success of the graft depends, will be displaced. It may be added that, even if this be prevented by holding the end firmly in a pair of bone-forceps, the bone being brittle is liable to be split or broken. Both Lindemann and Klapp advise that if the mucous membrane of the mouth be unfortunately divided, the operation be not proceeded with; when the wound has healed, it can be again attempted. The attempts to use grafts should not be made prematurely, for all writers, at home, in France, and in Germany, reiterate that bony union has followed even after many months, when least expected. Nevertheless, the insertion of a graft must not be too long delayed, for Soerensen points out that when what remains of the ascending ramus remains fixed for long in an abnormal position it undergoes considerable atrophy. The bone is much diminished in size, and soft and spongy in texture. It is doubtful whether it possesses regenerative power to develop sufficient new tissue to form a bony union with a graft.

Joseph, in the course of an article on plastic operations on the nose, advises that the subcutaneous fatty tissues of the skin-flap should be perforated in many places with a double-edged scalpel. The object is to form channels through which lymph may reach the graft from the cutaneous vessels. He also, like Lindemann, adopts Axhausen's suggestion of making parallel incisions through the periosteum of the graft. Lindemann advocated allowing the mandible a certain amount

of movement after the insertion of the graft, believing that thereby the growth of bone was encouraged. Experience has taught him that he was wrong. Now he fixes the mandible against the maxilla by ligatures passing between two fixed splints, and so maintains absolute rest. He finds that the primary union of the wound is facilitated, and that fixity of the graft follows earlier, usually in seven or eight weeks.

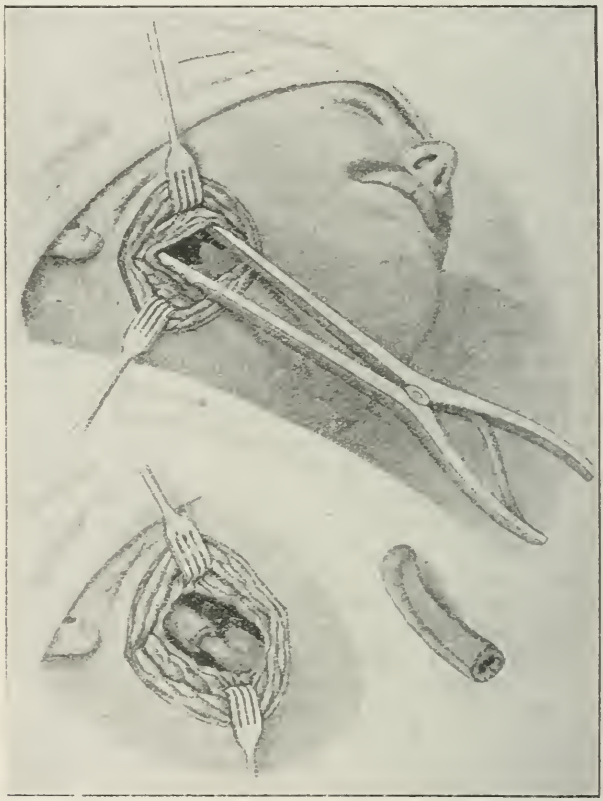


Fig. 44. – Kraft's method of inserting a bone-graft when the ascending ramus is almost completely destroyed.

When the ascending ramus is almost completely destroyed, little remaining but the condyle and the coronoid process, Klapp[5] inserts a bone-graft in the following way: An incision is made at the lower border of the mandible, and the end of the bone is exposed, pointed pieces, etc., are removed, the medullary cavity is opened, and a step cut on which to rest the graft. The wound is deepened in the direction of the remains of the ascending ramus, room being obtained to work by stretching the wound with forceps (*Fig.* 44). The coronoid process

PLATE XXVI.

GUNSHOT INJURIES OF THE JAW

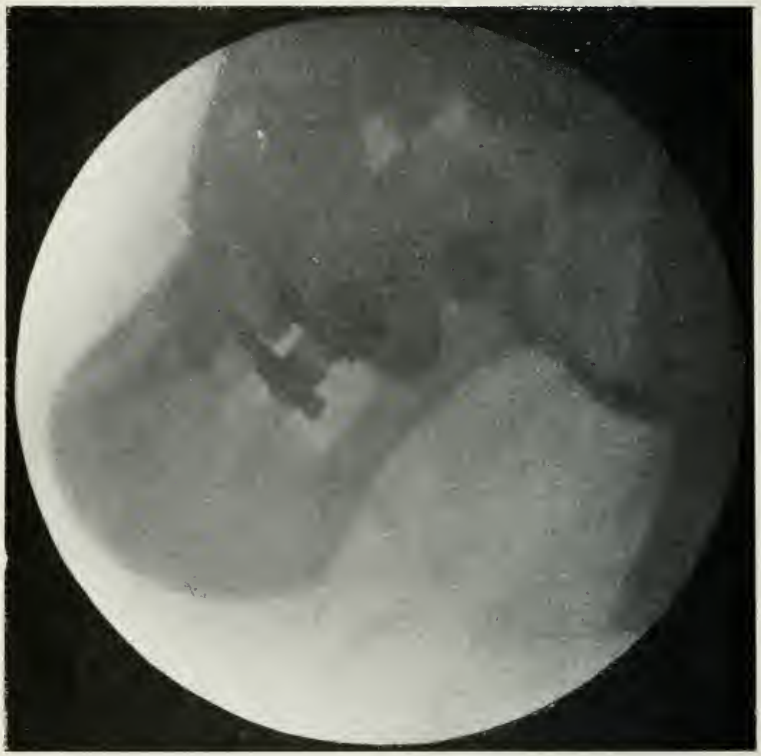


Fig. 15.—Showing the use of the fourth metatarsal bone as a graft to replace the ascending ramus of mandible.

is cut off and left, but the other bone fragments are, if possible, removed. When the piece of bone is large, the periosteum is stripped off and the bone removed subperiosteally. All hæmorrhage is arrested. If the piece of bone required is not more than 6½ cm. long, the fourth metatarsal bone is used for the graft ; if more, then the graft is taken from the iliac crest, the end of which, formed by the anterior superior iliac spine, is placed in the glenoid cavity.

To remove the fourth metatarsal bone, an incision is made on the dorsum of the foot over the bone. The extensor tendons are exposed and pulled aside, and the dorsal interossei separated from the peripheral end. This is then disarticulated from the phalanx, and lifted up with an elevator, and the bone gradually freed from the plantar interossei. Then the strong ligaments attaching it to the tarsal bones are divided and the bone is removed. The proximal articular head is cut off, and according to circumstances used as cut, or a notch, or step is cut on it. Klapp uses a catgut ligature to tie the graft to the mandibular end. He states that the weakness of the foot, naturally following, is usually entirely lost. But in view of its not always being entirely lost, Soerensen prefers not to use this bone, but to take the graft from the iliac crest.

Full details of twelve cases are given, the graft being usually the fourth metatarsal bone. In one case the graft was thrown off, whilst in another, 12 cm. long, the graft was totally absorbed, probably due to infection from ulceration of the mucous membrane of the mouth due to the presence of a prosthetic appliance. In the other cases bony union followed, and the results are said to have been good, though in two cases it is noted that the upper end of the bone was not in the glenoid fossa but in front of it. Movement is limited at first, but improves under treatment; in some, normal articulation is noted, and the patient is said to have been able to chew crusts of bread. In some cases the mandible, on the mouth being opened, moved to one or other side. One man is recorded as having been fit for service.

Fig. 45 shows a skiagram of the man who was able to chew crusts of bread. In this case the metatarsal bone was cut with an oblique but flat surface, and simply fastened to the mandible with catgut sutures. Klapp appears to use this method even when large portions of the ascending ramus are left, having in these cases failed with the usual methods of grafting. Soerensen[6] and Ganzer[21] protest vigorously against this. In such cases they have succeeded with ordinary grafts. They would reserve Klapp's operation for the comparatively few cases where this ramus is practically destroyed and absent.

Prof. Cavalie,[8] of Bordeaux, takes the grafts from the mandible itself, as, indeed, have others. He makes an incision along the lower border of the mandible, and exposes the fractured ends ; these he trims. The fragment chosen from which to remove the graft is rigidly held while the piece is cut off. The graft should be longer than the space between the fragments. When the space is not greater than 2 cm., one piece is sufficient : when it is greater, two or more are

inserted into the gap. It is generally easy to take two grafts, one from each of the fragments. The graft must have its periosteum and connective tissue attached ; on its deep surface there must be a layer of cancellous tissue. The graft is moved into the breach by sliding, or by turning over. (1) In sliding, one extremity of the graft is made to fit between the two compact layers in the spongy tissue of the other fragment ; the other extremity has its cancellous tissue in contact with cancellous tissue laid bare by the removal of the graft. Sometimes it is possible to slip the graft along, at the same time twisting it on an adherent piece of periosteum. To cut off the flap of bone the lower border of the jaw is first cut through with a chisel ; then a chisel is introduced between the tables of compact tissue to separate them. The extent of separation is limited by means of cuts made with a chisel and mallet. When two grafts are used they are placed side by side in the breach and held there by notches. (2) To turn a graft, it is cut so that it remains adherent by its periosteum at the fractured edge of the fragment, and this is used as a hinge ; the periosteum will be inside and the spongy tissue outside. When the grafts are in place, they are fixed by a deep catgut suture. A cutaneous suture completes the operation, which lasts from twenty to thirty minutes.

Imbert and Real,[9] who appear to think that the graft takes no part in the new formation of bone beyond acting as an excitant to the fractured ends, regard it merely as a support to these ends, when the gap exceeds 3 cm. It seems, in their opinion, merely to retain these ends in position and facilitate adaptation of a prosthetic appliance. They prefer to use the tenth rib, and insert the graft in two stages : (1) A small incision is made in the submaxillary region, and the tissues are separated ; in the pocket so made the graft is placed, with its concavity forward, and the wound is closed. (2) Five or six weeks later a curved incision is made, with concavity upwards, the ends of the incision being well over the ends of the mandible (*Figs.* 46, 47). A flap of skin is then raised, but the connections of the graft with the tissues are disturbed as little as possible. The ends of the mandible are exposed and pared, and the graft cut to the required length. The graft is now freed on its lower border and deep surface, and with adherent soft tissue turned so that the concavity looks backwards. The graft and the mandible are joined by screws (*Fig.* 48) and the wound is closed. The method appears interesting, but the results do not appear to justify duplicating the operation.

Lindemann places the results of his 282 cases, of which in 160 the graft was taken from the iliac crest, in five groups : (1) In 152 cases complete function was restored, i.e., bony union at both ends. The duration of treatment one and a half to thirteen months ; (2) In 42 there was slight abnormal movement at one or other end. (3) In 12 union was long delayed, but clinical signs and skiagrams gave a good prognosis. (4) In 18 progress was normal, but the time elapsed was too brief to know the result. (5) (*a*) In 18 a pseudo-arthrosis had formed at one or other end ; 11 were grafts inserted

beyond the region of standing teeth, and 6 were between the last molar and the front teeth. In 15 of these the mandible was not ligatured to the maxilla; (*b*) In 3 the graft was completely absorbed. (6) In

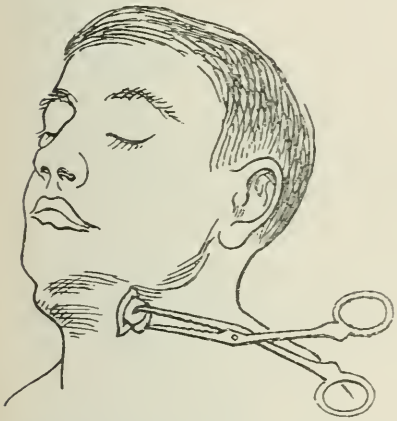


Fig. 46.—Bone graft: Imbert and Real's method. Step 1. The piece of bone introduced in the submaxillary region, after puncture of the skin by a bistoury.

Fig. 47.—Step 2. Cutaneous flap dissected and raised, exposing the bony ends. The bistoury freeing the graft on its lower border.

3 cases interruption of bony union occurred. Once, following too early a removal of the splint, the contraction of scar tissue caused the graft to protrude into the mouth, and twice the pressure of a splint caused ulceration and inflammation spreading deeply, and the grafts were thrown off. (7) In 30 cases suppuration followed: of these, in 18 the graft was expelled in whole or in part. Suppuration continued at the time of writing in 7 cases, and in the remaining 5 complete bony union followed. In only 4 of these cases was there complete absence of a bridge of bone; the others ended in pseudo-arthrosis. At his former compilation suppuration followed in 12 per cent of cases—now it is 10·6 per cent. He notes that in such cases, though callus had formed, it was to a certain extent absorbed after removal of the graft. In 7 cases the cause of the suppuration could not be determined; it may have been due to some error in asepsis, but equally likely it was due to the opening of some septic focus not visible to the naked eye.

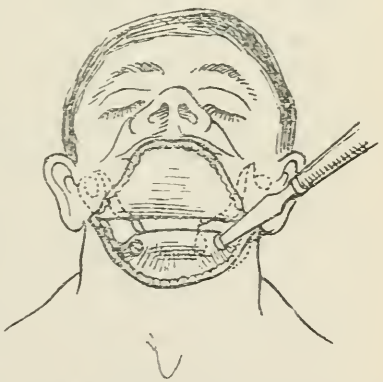


Fig. 48.—Step 3. The graft is raised, the attachments at its ends being preserved, and fixed by two screws to the extremities of the mandible.

At the Odontological Section of the Royal Society of Medicine, G. Northcroft showed a patient, wounded August, 1914, who was operated on by Lindemann and Bruhn at Düsseldorf, in March, 1915. A tibial graft was inserted, and fixed by ivory pegs. The posterior fragment was edentulous, and no external fixation was used. As far as one can gather, union was not satisfactory at the medial end, for the patient, having been interned in Switzerland on December 14, 1916, was operated on in February, 1917, for the excision of bone and hair from the anterior end of the graft. In May, 1917, Professor Matti inserted a graft from the crest of the ilium, the *x*-ray shadow of which can be seen. The information given was gathered from the patient, who, as Lindemann operates with regional anæsthesia, induced by novocain, was cognizant of events.

Just as Ollier, in pre-aseptic days, succeeded in one case in successfully grafting a complete shaft of a bone in an animal, and as Skykoff, of Moscow, obtained success with the first free autoplastic graft ever used on man to repair loss of mandibular tissue, so others have been successful in their first attempt at this operation. Others, equally careful, have failed, and those who have repeated the operation many times alternate between success and failure without being able clearly to define the cause. Nevertheless it would seem wise to lay more stress on the successes than on the failures. The benefit to the patient is very great, and after all, apart from the risks coincident to this as to every operation, if it fails the patient is no worse off, since he seems in most cases to suffer remarkably little local pain. Sébileau,[3] who had varying success, in the severe cases undertaken up to the time of writing, says: "Although our present methods are bound to be modified, we must persist and continue to practise the operation of bone-grafting. Success seems to depend upon a certain number of anatomical conditions, namely: (1) Healthy or only slightly damaged integuments; (2) An independent buccal mucous membrane capable of being freed both from the extremity and the external surfaces of the bony fragments; (3) Moderate separation of the fragments." The first is insisted on by all. If scar tissue be present it must first be eliminated by a cutaneous plastic operation. The second is confirmed by the advice given by those most experienced, to postpone the operation if the buccal cavity be opened. The third is clearly true, yet much larger bone-grafts than would be implied by "moderate separation" have been successfully inserted by those surgeons who have devoted time to a study of this work.

One condition equally, or even more, essential, not here included, though specified elsewhere in Sébileau's paper, is fixation of the mandibular fragments. When teeth are present in all of them, the fixation of splints presents no difficulty. The various forms were alluded to last year. When teeth are not present, the problem is different. Some have fixed the graft with ligatures, screws, plates, etc., and successes are recorded; but, generally speaking, the consensus of opinion is against their use if this be possible.

The chief difficulty arises in connection with correcting the displacement and fixing the ascending ramus if this forms the posterior fragment; or the ascending ramus with an attached, but edentulous, fragment of the horizontal ramus.

Two mechanical methods are used: (1) Splints with extension bars or arms, and (2) Bruhn's needle-extension method.

1. *Splints.*—In these an arm is attached in front to one or other form of splint fastened to the teeth. This arm passes backwards and carries a pad which presses on, carries to place, and then retains, the posterior edentulous fragment. *Fig.* 49 shows a form used by Soerensen.[6] (*b*) is a vulcanite splint fixing the larger fragment, and shaped to keep the mouth open, with a space for feeding purposes; (*a*) is a block of gutta-percha fixed to the metal bands shown fastened to the upper teeth. Gutta-percha is added till the posterior fragment is in place. The graft is then implanted, and the parts are kept in place by fixing the jaws together. Four weeks after the operation the splint is removed.

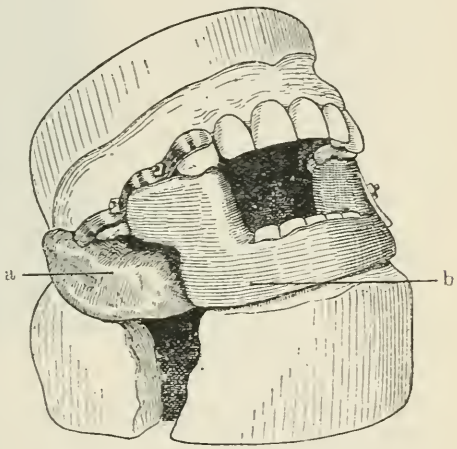


Fig. 49.—Soerensen's method of splinting edentulous fragments.

Comte[10] states that Frey, at the Val de Grâce Military Hospital, uses a splint consisting of a palate plate fitted to the maxilla and fixed by bands, from which a wing of vulcanite passes downwards, pressing on the mandibular fragment. Gutta-percha is added till the displaced fragment is in its normal position.

Lindemann objects to all those forms of splints which press on the mucous membrane of the mouth over the graft. He has seen them cause ulceration, which in turn has infected the graft.

2. *Bruhn's Needle-extension Method.*—Last year brief mention was made of this method, which is a development of the Codivilla-Steinmann needle, and the form then used shown. The mandibular attachment, as used at Düsseldorf, has since been simplified in form (*Fig.* 50). It is made in pure silver. The plate is 2 to 2½ cm. in diameter. The wires, 1 mm. thick, are distant 1½ cm. This plate is introduced beneath the periosteum, and the wires pass through the bone and the cheek, and are fixed to an arm joined to a head bandage or a mandibular splint (*Fig.* 51). It must not be used till all septic foci have been eliminated in the field of operation. Personal experience has shown this method does what is claimed. It has remained in place over three months and caused no complication.

Lindemann has inserted this apparatus and the graft at one and the same time, but usually waits eight to fourteen days. If the interval be too long it may set up inflammation, and if too near the end

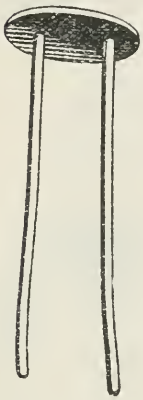


Fig 50.—Improved needle-extension appliance.

Fig. 51.—Brulin's needle-extension method.

of the bone, this may be absorbed and interfere with the insertion of the graft. It should remain in place till absolute fixity of the graft is attained; the period therefore varies with the case. Lindemann

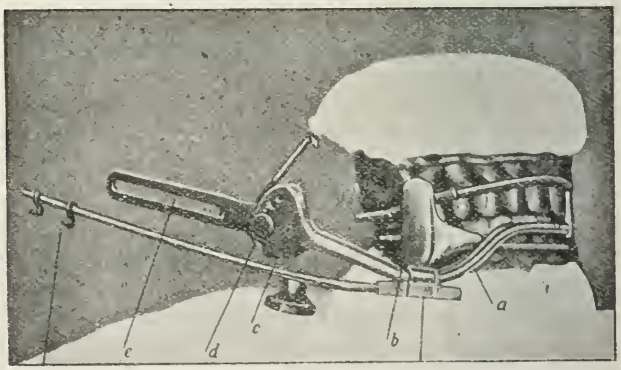


Fig. 52.—Welke's appliance for the needle-extension method.

had used the method twenty-five times, some of these being associated with a bone-graft. To avoid two operations, Adolf Beeker[7] fixes the needle and implants the graft at one and the same time; then, in

PLATE XXVII.

SHOWING THE NEEDLE EXTENSION APPARATUS IN POSITION

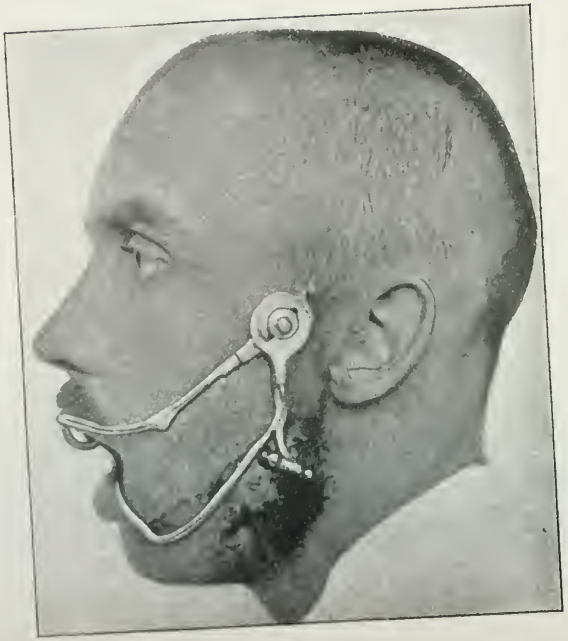
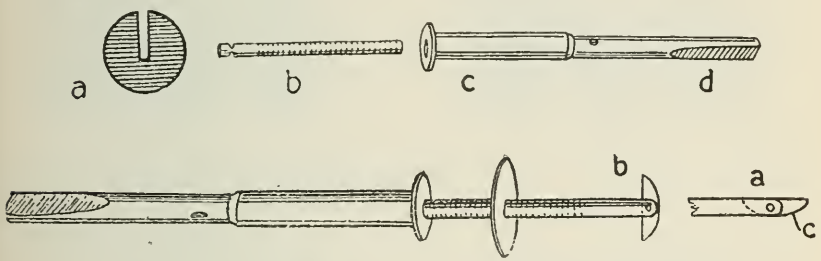


Fig. 55.—Schröder's method.

Fig. 56.—Lindemann's method

order to overcome the displacement of the ascending ramus, for which this method was primarily designed, it is necessary to free the bone of its attachments up to the joint. He speaks of good results, but in general terms, without entering into particulars. At Hanover they prefer to do away with the irksome head bandage and to fix the extra-oral wire to an intra-oral splint. They use an arm designed by Welke (*Fig.* 52). The principal novelty is that the supporting wire (*a*), or wires, end in a hinge (*c*); in this works an arm (*e*) perforated with an elongated slot. This arm can be fixed at any level found to be necessary at the time of the operation, to keep the ramus in the correct position. The extra-oral end of the 'needle' passes through and is fixed in the slot. An extra wire is fixed if it is necessary to complete the replacement by elastic traction.

The form of 'needle' used by Schröder[5] is shown in *Figs.* 53 and 54. In *Fig.* 53, (*b*) is the needle, which is introduced from without in; this



Figs. 53, 54.—Schröder's needle.

is obviously an easier method than the reverse as in the Bruhn-Lindemann technique. When in place the plate (*a*) is slipped with its slot in the groove in (*b*). Then (*c*) is screwed on to (*b*). *Fig.* 54 shows a second method of fixing the plate. On the end of the needle a stop is hinged—this sinks into a slot in the needle, so that it will pass through the hole in the bone; (*a*) is the needle as introduced, (*b*) as it is when (*c*) is turned round on (*a*).

Schröder's method of fixing the needle extension is seen in *Fig.* 55. In this case a piece of bone was missing from the second molar to the angle. The wires are fixed in front to two metal cap splints covering respectively the upper and lower teeth. The upper is soldered to two U-shaped wires attached to the splint, but the lower fits into a metal cylinder and is removable. The joint, placed over the temporo-mandibular articulation, is formed by two discs of metal, one soldered to each wire and joined by a pin soldered to the inner disc. Thus backward movement of the anterior portion of the mandible is prevented. The wire passing to the needle has a split tube at its upper end, which is moved on the lower wire to the correct position and then soldered to it.

Lindemann has used the method for keeping in place edentulous fragments, and especially when the medial portion of the mandible is

detached and falls backwards, causing the tongue to impede respiration, etc. Soon after the injury, through quite a small wound, a hooked wire is passed round the lower border of the mandible, and the displaced portion drawn forward and fixed by wires to a head bandage (*Fig.* 56). For such cases tracheotomy has probably already been performed.

Plastic Operations.

Percival Cole[11] lays down as an axiom that the repair of damaged or destroyed soft parts should never be undertaken until fractured fragments have been efficiently splinted. In many cases in which repair of the soft tissues has been undertaken before the insertion of the splint, it has been necessary for him to undo all that has been done to enable an efficient appliance to be inserted. Broadly speaking, early suture is not to be recommended in cases associated with bony lesions. In uncomplicated laceration, with little or no loss of tissue and not involving the mucous membrane of the cheek, early suture has a definite claim to consideration. Time will be saved and the formation of scar tissue to a large extent obviated.

Major Kazanjian[12] states that the experience of the Harvard Surgical Unit shows that there does not appear to be much scope for primary suture of gunshot wounds complicated by fracture of the jaw; but some advantage may follow accurate primary suture of those portions of a wound which involve the lip margins, the eyelids, the alæ of the nose, portions of the external ears, or the outlying tributaries of a radiating wound, provided such suturing is limited and no attempt is made to close the entire wound. Early secondary suturing has been increasingly employed. The interval varies with the condition of local sepsis, but usually it is done between the fifth and twelfth days. It has done much to lessen the amount of deformity from scarring. Large flap operations are invariably postponed until all suppuration has disappeared. On the other hand, Valadier and Whale[13] say in general terms that, however dirty the wound, it should be closed in a few days, and long before it is thoroughly clean. An official French medical order exists, demanding that all such wounds be closed as soon as possible after having been thoroughly cleaned with ether. Valadier says he has seen in hospitals in France many faces shattered beyond any chance of satisfactory correction: large flaps hopelessly inverted, cicatrized, and almost keloidal.

There is a similar difference in the opinions held on this matter between Lindemann, of Düsseldorf, and Ganzer, of Berlin. It must certainly be admitted that cases seen of early suture have done remarkably well, but it has been a matter for regret that a simple, ready made, and easily adjustable splint has not been fixed to retain the fractured portions of the mandible in position. This could have been done at the same time had arrangements permitted. Failing this, no reduction and fixation of the mandibular fragments is possible till the skin flaps have united; this delay may jeopardize

PLASTIC OPERATIONS IN INJURIES OF THE FACE AND JAWS

Fig. 57.

Fig. 58.

Fig. 59.

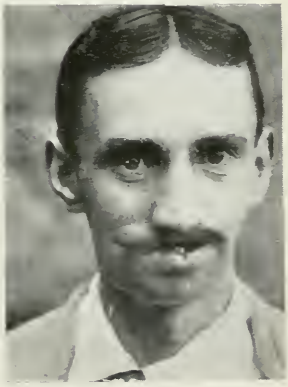


Fig. 60.

Showing the ill effects produced by non-retention of supporting apparatus.

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PLASTIC OPERATIONS IN INJURIES OF THE FACE AND JAWS—*continued*

Fig. 61.

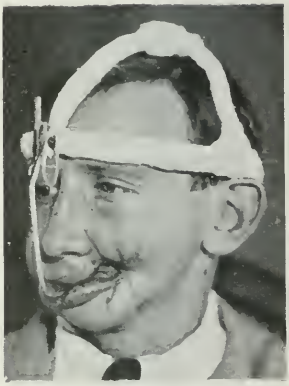

Fig. 62.

Fig. 63.

Fig. 64.

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the chance of obtaining bony union, and in any case render correction of displacement more difficult. Pierre Sébileau,[3] the eminent French surgeon, draws attention to the rapidity with which displacements, left to themselves, are fixed by fibrous tissue and become irreducible. His opinion is "that in the large majority of cases the retaining apparatus can and ought to be applied in the first days following the wound."

Gillies and King[14] illustrate the value of the use of mechanical supports or shields in plastic operation for restoration of the contour of the face. They are of opinion that every effort should be made before operation to fix the requisite appliance; that when this is impossible owing to cicatricial bands, much of the apparatus should be prepared beforehand, and the rest fitted during the operation. When fitted, and the plastic operation completed, no attempt should be made to remove it until the tenth day, by which time the flap should be firmly united. They give the following reasons: Its removal causes pain, considerably disturbs the commencing union of the flaps, allowing septic material from the mouth to invade the soft tissues, and if removed, the apparatus can seldom be replaced in the same bed, and is, hence, uncomfortable. They maintain cleanliness by the usual oral hygiene, but in lower-jaw cases, in order to avoid any cul-de-sac, external drainage is usually provided.

The ill effects of non-retention of the supporting apparatus are illustrated in *Figs.* 57 to 60. Patient was wounded Feb. 14, 1916; admitted April 15, 1916; operation June 21, 1916. The lip appeared to be satisfactory, but owing to an attack of bronchitis the support (*Fig.* 58) was removed and the lip gradually fell in (*Fig.* 60). The nasal deformity was automatically rectified by utilizing the flesh buried in the left nostril to form part of his new lip. The lip had to be stretched (*Fig.* 59). Two further operations have got over these difficulties with satisfactory result, but these two operations might conceivably have been unnecessary.

Figs. 61 to 64 show the beneficent action of splints and shields. The patient was edentulous, which made the case difficult. The apparatus consisted of: (1) A palate plate which replaced the tissues of the palate; (2) A splint retaining the three fractured parts of the mandible in correct position; and (3) A vulcanite flange to support the lips and cheeks during and after operation. Patient was wounded July 1, 1916. Characterized by partial loss of superior and inferior maxillæ, cheek, upper lip, and corner of mouth. Result of the first operation on Oct. 4, 1916, is shown in *Fig.* 63; his condition immediately preceding is shown in *Fig.* 62. *Fig.* 63 result was obtained by cutting two flaps, one from the cheek and one from below the chin. Subsequent operation has markedly improved the left corner of the mouth.

In the Harvard Surgical Unit, in all cases in which there is an appreciable loss of substance, and a plastic operation is contemplated, an appliance to replace lost bone is always made to serve as

a framework, to give a natural contour to the soft tissues of the face or neck, and to prevent undue scar-contraction.

Patients have been seen on whom plastic operations have been performed to re-form the lips, and who cannot bring teeth in contact, and hence suffer all the discomforts arising therefrom. It may be, in such cases, no shields were used, and that, partly in consequence thereof, the size of the flaps was under-estimated. Northcroft appeals to surgeons to make the flaps big enough to avoid this and contraction of the buccal orifice.

Cole[11] points out that the loss of soft parts, particularly those covering, and associated with, injuries of the maxilla, is more apparent than real. The skin edges curl over and invert sufficiently to permit firm adhesion to the margins of the bony gap. Much can be done then by freely stripping the tissues from the bone, followed by careful and separate readjustment of mucous membrane and skin surface. He classifies the various types of flaps used to make good loss of soft tissues as follows: (I) *Single flaps.*—1. Sliding. 2. Transposed: the type commonly used to remedy ectropion. These two forms can only be used when the tissues in the immediate neighbourhood of the gap are sufficiently lax to admit of direct borrowing. 3. Transferred: depending temporarily for blood-supply on a pedicle situated at a distance. 4. Hinged: a flap rotated on a hinged pedicle formed at the margin of the gap. (II) *Doubly epithelialized flaps.*—1. Formed in the gap coincident with its closure by the interposition of a single flap, with the immediate or later imposition thereon of a second single flap. 2. Formed at a distance, formation antedating closure: (*a*) with one primary pedicle, (*b*) with two primary pedicles. He says the use of single flaps is practically confined to reparative work on the lips. For this purpose the sliding and transposed flaps only can be utilized. The mucous membrane on the deep surface is included in the flap.

Esser,[15] of Arnheim, working with the Austrian troops, uses what he calls 'island flaps.' There is no skin pedicle, but one of the deep soft tissue. It is taken from as near the defect as possible, and is placed so that a branch of an artery is in the pedicle. When a bridge of skin remains between the defect and the flap, this is divided, and some tissue removed to form a bed for the pedicle. The flap, he says, may be half the size of the defect, since the latter is decreased in size in sewing in the flap. He claims that the advantages of the island flap are striking in nourishment and cosmetic effect, as no turned skin pedicle is to be seen and the tension is equal everywhere. He does not use bandages after the operation, but dusts the wound with calomel, from which, he says, traces of sublimate are constantly formed. He has not observed deleterious effects. He endeavours to obtain absolute immobilization—the patient must not speak nor move lips, is given liquid diet through a tube, and for a few days is forbidden the very important rinsing of the mouth, but sometimes syringes gently. He makes no mention of the use of shields.

Esser's statement with regard to the size of 'island flaps' may be contrasted with Lawson Whale's, that the shrinkage of ordinary flaps, commonly given as one-sixth of the area, is one-third in the experience of Valadier and himself, so that a piece of soft tissue should be cut one-third larger than it is ultimately intended to be. It shrinks for many weeks, and in all diameters. A nose made from the frontal tissues shrinks upwards towards its pedicle, so as to lie too high on the face; and the piece fashioned for the columella may shrink until it is not long enough to reach the lip.

Aymard[16] calls attention to his method of making the skin incision in plastic operations on the slant instead of at right angles to the surface. He claims that this gives a more artistic result in the neighbourhood of the cheek, mouth, chin, and forehead; but he uses the right-angle incision when the skin is loose and mobile, as around the eye and in the neck. When the object of the operation is to fill up the gap produced by the excision of a depressed scar, he proceeds as shown in *Fig.* 65. The thick black lines represent the undercutting straight down to the bone, and in the direction of the arrow marks up to the skin; the block is thus dependent upon the skin flap for its blood-supply. These blocks of tissue can then be easily rolled inward, and secured with catgut, thus filling up the gap and restoring the contour. For suturing such wounds, whether the incision be cut upon the slant or at right angles, he now commonly employs the mattress suture (*Fig.* 66). This, he claims, keeps the deeper tissues in contact until union is secured, despite moderate tension and suppuration, should such occur, even though the mattress

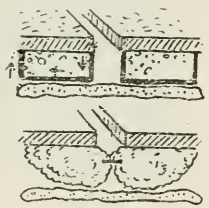

Fig. 65. — Aymard's method of skin incision in plastic operations.

Fig. 66.—The mattress suture.

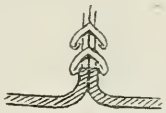

Fig. 67.—The Michel clip.

horsehair suture cut quickly through the cuticle. He is of opinion that though the ordinary interrupted suture may hold for a couple of days and keep the cuticle in contact, it has not so held the deeper tissues, whilst if it cuts out it leaves a wide scar. The action of the mattress suture is similar to that of the Michel clip (*Fig.* 67), which Aymard does not regard as suitable for the face.

Esser[17] introduces the stitches perpendicularly or receding from the wound edge, and is careful that the knots are not over the cut. All tension is borne by deep sutures, but he seldom uses large suture plates as does Lindemann. These, he says, cause pressure necrosis. It may be doubted whether this is the case in the way Lindemann uses

them. Esser's method of raising a depressed scar is shown in *Fig.* 68. The incisions are carried into the deep tissue. This is then divided along the dotted lines, and the two freed portions are sewn together,

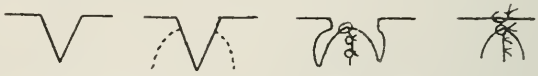

Fig. 68.—Esser's method of raising a depressed scar.

so raising the line of the surface wound, the edges of which are finally sutured.

E. Comte[10] states that at the Val-de-Grâce Military Hospital, Paris, cartilaginous grafts, usually costal, are used, instead of the easily-absorbed fat-graft, to raise a deeply-depressed scar.

Masks for Facial Wounds.

There are cases with facial deformity which plastic surgery has so far been unable to help. Such patients must wear a mask. Beautiful as some of these are, particularly those made by the sculptor, Mr. Derwent Wood,[18] it must be realized they are but masks, and only applicable where surgery has failed. Derwent Wood's technique is as follows. When all wounds have healed superficially, a cast of the face is taken in plaster-of-Paris. All wound cavities are filled up with dressing and cotton-wool, and these in turn covered with gold-beater's skin. The nostrils are blocked with cotton-wool, the patient breathing through the mouth; if through the nose, a quill is inserted for breathing throughout this operation. The mould is dried slowly, dusted with French chalk, and a counterpart taken in clay or plasticine. This mould is perfected by the sculptor. When perfect a negative is taken from it in plaster, and on this model, at the next sitting, the portions to be hidden are moulded in clay or wax, the edges being thinned to blend with the face. A cast of this in plaster is obtained, and adjustments are made for an artificial eye, if required. An electrotype plate of copper, $\frac{1}{32}$ in. in thickness, is now made, and coated with silver. Spectacles are adjusted to retain this plate, but gum spirit and ribbons are also used. The plate is covered with cream-coloured bath enamel, and on this flesh tints are painted. Eyelashes, eyebrows, etc., are made of slit tinfoil soldered to the metal lids. *Figs.* 69 to 72 show photographs of a case treated by Derwent Wood.

Pont,[19] of Lyons, adopts the method of Hennings, of Vienna. A nose or ear having been suitably modelled, a plaster mould of it is obtained in two parts. Into this mould, through a vent-hole, a mixture is poured which is liquid when hot, but elastic and very tough when cold. Hennings' formula not being available, Dr. Duplaut worked out for Pont the following: gelatin (pure white) 20, colle coignet 5, glycerin 62, distilled water 25. The paste is coloured with yellow ochre and vermilion to match the skin. When cast, the surplus paste is removed with a pair of scissors to leave a clean edge.

PLATE XXX.

EMPLOYMENT OF MASKS IN CASES OF FACIAL DEFORMITY

Figs. 69 and 70.—Before and after.

Figs. 71 and 72.—Before and after.

By kind permission of the 'Lancet.'

PLATE XXXI.

PROSTHETIC APPLIANCES IN FACIAL INJURIES

Figs. 73 and 74.—Illustrating the value of prosthetic appliances in facial injuries.

It is 'stuck on' with one layer of a paste composed of putty in streaks 15 grm., Canadian balsam 2·5 grm., sulphuric ether 15 grm. The edges are smoothed with a blunt instrument and slight heat. It may be touched up with a carmine pencil and dusted with rice powder. These artificial noses and ears require fairly frequent renewal, and the patients are given the moulds and a supply of material so that they can cast them themselves. A case is shown in *Figs.* 73 and 74.

Derwent Wood's appliances require repainting from time to time; indeed, it is this tendency to get dirty which was always the difficulty with this type of work even in pre-war days, when similar but perhaps more amateurish attempts were made.

Hæmorrhage in Jaw Injuries.

Kazanjian and Burrows[20] state that among 400 cases in the Harvard Surgical Unit they had 16 of secondary hæmorrhage requiring operation, and 17 successfully treated by local methods. Details of these cases are given. The majority occurred between the fourth and twelfth days after injury, three between the thirteenth and nineteenth days, and one on the forty-fifth. The hæmorrhage usually happened in the night or early afternoon, and not during feeding, dressing, fixing appliances, etc. The most serious and common cases were the result of extensive wounds of the molar and premolar region of the mandible, with injury to the floor of the mouth. In cases which presage hæmorrhage from the lingual artery, the wounds of entry and exit are usually small and in the posterior half of mandible; this is fractured on both sides, the medial portion being displaced downward and mobile. The tongue is perforated, often dark purple in colour and swollen, protruding beyond the lips. Open wounds and those in front of the mouth are less prone to bleed, since the vessels are smaller and free drainage checks sepsis. The immediate treatment consists in cleaning the wound with peroxide of hydrogen and packing it with adrenalin gauze. To retain such packing the clamp shown in *Fig.* 75 has proved useful. It is bent up from a piece of strong iron wire, eight to ten inches long, the pads being of vulcanite or modelling composition. An elastic band forms the compressing force.

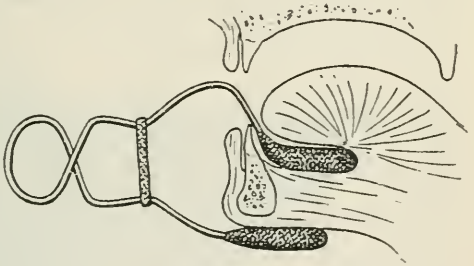

Fig 75.—Lingual artery clamp. (*From* '*The British Journal of Surgery.*')

The artery is ligatured at the bleeding point, if possible, but this is impracticable in the majority of profuse intrabuccal hæmorrhages from the floor of the mouth. It is often difficult to know which vessel

is bleeding, and whether the vessel is on the right or left side, or if indeed both are wounded. The common carotid was ligatured in 4 cases ; 3 patients died, and the one who recovered had hemiplegia—a history, as they say, needing no further comment. Ligature of the external carotid in 10 cases was followed by 5 deaths. Hæmorrhage has recurred after its ligature.

They now act on the assumption that the source of hæmorrhage is the lingual artery, and ligature it—or indeed both linguals—in the first or second part of its course, and they hold they have been justified by improved results and a lowered mortality. Should it prove later that the bleeding comes from the inferior dental, this can be more easily checked temporarily pending arrangements for further operation.

In these cases the operation of ligaturing the vessels is rendered more difficult by the displacement of a fractured mandible, by the swelling of the neighbouring soft tissues, and by the presence of a septic wound. In some cases the submaxillary salivary and lymphatic glands have been so joined together as to form an unyielding mass, which they have had to remove in order to expose the lingual artery. The presence of the septic wound indicates ligaturing the artery as far from it as possible, e.g., the first instead of the second part of the lingual ; further, they ligature the vessel in two places and divide it between ; it prevents repetition of the hæmorrhage at the seat of the ligature owing to sepsis. This happened twice from the external carotid when a single ligature was used. The high mortality was consequent on the grave nature of the wounds and previous loss of blood. *Case* 9 may be quoted :—

Wounded by rifle bullet Oct. 12, 1916. Entry above right premolar region. Mandible fractured at right premolar region. Nov. 1—Hæmorrhage ; right side of mouth packed. Nov. 9—Hæmorrhage ; packed and clamp applied. Nov. 19—Hæmorrhage ; right facial artery ligatured under novocain. Nov. 21—Hæmorrhage ; right lingual ligatured under general anæsthetic. Dec. 5—Hæmorrhage ; callus divided at seat of fracture ; inferior dental artery occluded. No further bleeding ; recovery.

References.—[1]Gérard Maurel, *La Restauration Maxillo-Faciale*, and *Dent. Rec.* 1917, Nov., 535 ; [2]Norman G. Bennett, *Pract.* 1917, Sept., 201 ; [3]Pierre Sébileau, *War Suppl. Brit. Dent. Jour.* 1917, July, 185 ; [4]Lindemann, *Modern Treatment of Gunshot Injuries of the Jaw at Düsseldorf*, 1917, parts 7 and 8 ; Bergmann, Wiesbaden ; and Dolamore, *Treatment in Germany of Gunshot Injuries of the Face and Jaws*, 1917, part 3 ; [5]Klapp and Schröder, *Gunshot Fractures of the Mandible*, 1917, Mausser, Berlin ; [6]Soerensen, *Chirurg u. Zahnartz*, 1917, part 1 (Springer, Berlin) ; [7]Becker, *Deutsche Zahnheilkunde*, 1917, part 39 ; [8]Cavalie, *L'Odontologie*, and *Dent. Rec.* 1917, June, 270 ; [9]Imbert and Real, *La Restauration Maxillo-Faciale*, 1917, April, 20 ; [10]Comte, *Revue Trimestrielle Suisse d'Odontologie*, 1916, No. 4, and *Dent. Rec.* 1917, Sept., 425 ; [11]Cole, *Lancet*, 1917, i, 415 ; [12]Kazanjian, *Brit. Jour. Surg.* 1917, July, 126 ; [13]Valadier and Whale, *Brit. Jour. Surg.* 1917, July, 151 ; [14]Gillies and King, *Lancet*, 1917, i, 412 ; [15]Esser, *N. Y. Med. Jour.* 1917, ii, 264 ; [16]Aymard, *Lancet*, 1917, ii, 347 ; [17]Esser, *Surg. Gyn. and Obst.* 1917, i, 737 ; [18]D. Wood, *Lancet*, 1917, i, 949 ; [19]Pont, *La Restauration Maxillo-Faciale*, 1917, May, 57, and *Brit. Dent. Jour.* 1916, July, 492 ; [20]Kazanjian and Burrows, *Brit. Jour. Surg.* 1917, July, 126 ; [21]Ganzer, *Dent. Monats. f. Zahnheilk.* 1917, Sept.

JOINTS, SURGERY OF. *W. I. de C. Wheeler, F.R.C.S.I.*

J. E. Fould[1] discusses the treatment of *hallux valgus*. He considers that many of the orthodox operations are followed by recurrence of the deformity, destruction of the transverse arch, and pain on

Fig. 76.—C, capsule; T, tendon of abductor hallucis to be transplanted.

walking. He describes an ingenious operation for the condition as follows:

"The usual operation of the resection of the head of the metatarsal bone only temporarily corrects the deformity. To prevent recurrence, I devised a method of transplanting the tendon of the abductor

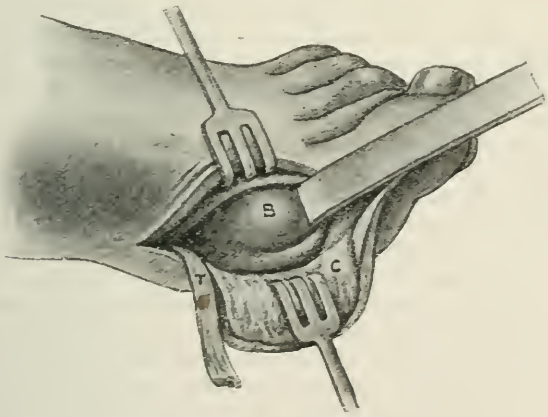

Fig. 77.—B, bony projection; T, tendon of abductor hallucis; C, capsule.

hallucis from its usual insertion in the plantar surface of the base of the first phalanx to the periosteum covering the middle of the inner surface of the first phalanx. To meet the third requirement of any successful operation for hallux valgus—the preservation of the longitudinal arch—I confined the bone section to the exostosis without

resection of the head, and followed this by suturing the capsule over the denuded bone area, deep to the transplanted abductor tendon, to prevent involvement of the transplanted tendon in the subsequent and inevitable callus. The histories of a large number of cases treated by this operation show that it was rarely necessary to resect the head of the metatarsal bone. After a thorough trial of the various operative methods, this one has given the best results. The simplicity,

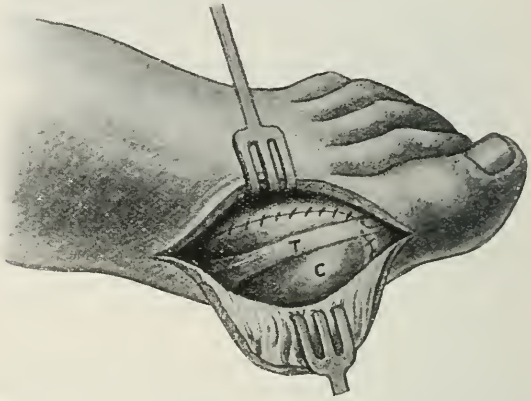

Fig. 78.—T, tendon transplanted and sutured; C, capsule sutured.

ease, and safety with which it can be performed, in my opinion warrant its trial in these cases. It allows the patient to walk well and absolutely without pain; the great toe remains in perfect position and is naturally mobile, and it does not affect the weight-bearing function of the foot."

The stages of the operation are shown in *Figs.* 76–78.

Alexis Thompson[2] discusses the rôle of arthroplasty in treatment of *ankylosis.* In an ankylosed shoulder he obtained a movable joint by wrapping the upper end of the humerus in a sheet of fascia taken from the thigh. In the case of the elbow he interposed the fascia in the form of a flap over the triceps muscle. The movements in a knee-joint were restored to a large extent by raising an adherent patella, which was united to the femur, and placing a free flap of fascia between the bones. In bony ankylosis of the hip-joint following a gonococcal infection, Murphy's arthroplasty was employed. The result was unsatisfactory. Thompson thinks that, having regard to the frequent recurrence of ankylosis after excisions in cases of injury, fat or fascia should always be interposed. He does not advise arthroplasty in joints which have become ankylosed as a result of infection, but the operation may be brilliantly successful in joints ankylosed by purely traumatic lesions.

Barling,[3] writing on the surgery of the *wounded knee-joint*, regards aspiration and the injection of antiseptic fluids as rarely sufficient to

combat infection. Three other courses are open: (1) Re-opening up of the joint; (2) Excision of the joint; (3) Amputation. It is the experience of surgeons working at home to find that primary excision is followed by poor results, and probably should only be resorted to in cases of gunshot wounds where the alternative is amputation. Barling means by the free opening of the joint a lateral incision on each side to the extreme limits of the great bursal pouch. Some surgeons divide the lateral ligaments, but this should be reserved for cases in which the less severe operation is found insufficient. The free opening of the joint is followed by the introduction of about four Carrel's tubes and the installation of Dakin's fluid. In a few days' time the tubes are arranged so as to lie outside the joint.

Grey[4] urges the excision *en masse* of all tissue which is definitely or probably infected. The operation is then completed on aseptic principles and primary suture. Drainage is provided down to, but not into, the joint.

Doberauer[5] records an interesting case of an *infected elbow-joint* in which the bullet made a hole in the olecranon process. The drainage was perfect and the functional result excellent. Since then he has systematically trephined in all cases requiring drainage of the elbow. He considers the advantages to be drainage by gravity, at the same time leaving the muscles, ligaments, and nerves uninjured.

Haberer[6] is impressed by the fact that most wounds of joints do not become infected. Fixation and leaving the joints alone are the best initial treatments except in gas phlegmons. If fever, pain, and swelling keep up, the joint should be punctured. Where pus or purulent effusion is found, a small incision is made and a rubber drain introduced, the cavity being washed out with a 1 to 4 per cent solution of formaldehyde. The functional outcome is much better with multiple small incisions than with an extensive opening.

Blind[7] makes a very timely plea for a co-operation between general and orthopædic surgery in all cases of bone and joint and muscle injury received in the war. He cites cases in which long immobilization in positions unfavourable for future function had resulted in an incapacity from which the patients could never fully recover.

Claw-foot.—It is a remarkable fact that, common as this condition is, the deformity has not seemed to gain much attention from either the general or orthopædic surgeon. The cause is far from clear. Unlike other deformities of the feet, the origin of claw-foot cannot be traced to trauma, rickets, congenital defects, or infantile paralysis. It is sometimes due to a transitory paralysis of the extensor group of muscles, and the short boot also stands in some causal relation to it. Robert Jones[8] states that there are five degrees or stages of claw-foot. The first stage is seen in childhood, the only objective sign being a shortening of the tendo Achillis. The child cannot dorsiflex the foot sufficiently, and is therefore constantly tripping over his own toes. A lengthening of the tendo Achillis cures the condition. In the second degree there is definite contraction of the

plantar fascia, and the characteristic deformity of the foot is easily observed. The plantar fascia should be divided subcutaneously, and the head of the first metatarsal bone drawn up by attaching to it the tendon of the extensor longus of the great toe. Thirdly, if untreated in the early stages the claw-like deformity becomes rigid, and, to correct it, it is often necessary to remove portions of the shafts of all the metatarsal bones save the fifth, which acts as a splint for the others. Later still, in the fourth degree of claw-foot, a well-marked varus deformity appears; and in the fifth degree there is an exaggerated talipes equino varus with many painful callosities over points of pressure. The patient often begs for amputation; the foot, however, should be saved by removal of the astragalus and amputation of all the toes with the heads of the metatarsal bones.

Osteo-arthritis.—Wheeler[9] discusses the operative treatment of osteo-arthritis. He thinks there are three classes of cases which may receive benefit by operation. (1) In young subjects there is often a line of cleavage between the old and new bone, such as is commonly found in connection with the head of the first metatarsal in cases of bunion. The removal of the osteo-arthritic lipping in such cases is easy of accomplishment, and is followed by good results without a tendency to recurrence. This class of case is illustrated in the paper by an *æ*-ray photograph showing the result of the removal of osteophytes from the hip-joint three years previously. Full movements were restored, and there was no sign of recurrence. (2) In elderly people, irregular osteophytes form in connection with the joint, following ossification in the fibrous layer of the capsule. In such cases there is no attempt at a line of cleavage, and the removal of the osteophytes leaves behind large areas of raw bone. Ankylosis, unless prevented by a successful arthroplasty, often follows the simple operation in these cases. (3) Cases of 'rheumatoid' arthritis causing destruction of the joints without osteophytic outgrowths. When the disease attacks the hands and feet of young people it is most painful and crippling. Wheeler thinks that the rôle of the colon in such cases should receive more attention. He has had some excellent results after colectomy in selected cases.

References.—[1]*N. Y. Med. Jour.* 1917, ii, 265; [2]*Edin. Med. Jour.* 1917, Sept., 176; [3]*Brit. Med. Jour.* 1917, ii, 277; [4]*Ibid.*; [5]Quoted in *Boston Med. and Surg. Jour.* 1916, i, 682; [6]*Ibid.*; [7]*Ibid*; [8]*Brit. Med. Jour.* 1916, i, 749; [9]*Lancet*, 1916, i, 1255.

KALA-AZAR. (*See* Leishmaniasis.)

KERATODERMIA BLENNORRHAGICA. *E. Graham Little, M.D., F.R.C.P.*

Several writers have published new records and written papers on this somewhat rare disease. It is probable that many cases have escaped recognition, and that as attention is directed to it more instances of this important affection will be reported. Haase[1] claims the third American case, and contributes a full and well-illustrated record of it. Simpson,[2] who saw the first American case, reports

PLATE XXXII.

KERATODERMIA BLENNORRHAGICA

(CAPTAIN CRAWFORD LUNDIE'S CASE.)

By kind permission of 'The British Journal of Surgery.'

PLATE XXXIII.

KERATODERMIA BLENNORRHAGICA

(Graham Little's Case.)

E. Graham Little

two new instances. Brown and Hargreaves,[3] in an investigation of 20,000 cases of gonorrhœa, found only three instances of gonorrhœal keratosis, one of which they report in full. Graham Little[4] records a new case, and gives a full bibliography up to the date of his paper, and Captain Crawford Lundie records two other cases, one of which is well illustrated in colour.[5] (*See Plates XXXII, XXXIII.*) A very clear-cut impression of disease results from a consideration of these cases, which may be presented as follows. The three cardinal symptoms marking the syndrome are urethritis, arthritis, and keratosis, usually appearing in that order. It is uncommon to observe the skin complication with a first attack of urethritis, and there are usually repeated infections before the skin condition develops. In several cases the urethritis had ceased months and even years before the keratosis showed itself. Other symptoms—besides the skin eruption—of grave absorption of toxins are usually present, such as cachexia, emaciation, especially profound muscular wasting; sustained but moderate rises of temperature. Myocarditis and endocarditis seem noticeably frequent. Tachycardia is a very prominent symptom. Ophthalmia, as might be anticipated, is often met with in some form, conjunctivitis and iritis being the commonest types. Anæmia is generally profound and intractable. Testicular disease is mentioned in a considerable proportion of cases. Renal and hepatic disorders are, on the whole, less frequent than might be expected with so grave and prolonged a toxæmia.

The keratosis, which is, as has been stated, a late symptom, is met with in the great majority of cases in two forms: (1) as waxy horny yellowish cones, and (2) as a carapace-like hardening of a considerable portion of skin, usually of the soles of the feet, but sometimes met with on the hands and elsewhere. A third variety of lesion has been described, and by some is believed to be the precursor of the other types, namely, a vesiculo-pustular lesion, but this has been observed in comparatively few of the cases. The keratodermic type of lesion is the most persistent and the most frequently described, and has been accordingly selected to name the syndrome. In only one case, as Simpson points out, have gonococci been demonstrated in the actual skin lesions, namely, by Wadsack; but the connection of the skin eruption with the gonorrhœal causation is confirmed (as far as such evidence goes) by the effect on the eruption of the administration of gonococcal vaccine. The etiology of the eruption is, however, still in doubt, and a very remarkable fact is that whereas women suffer not infrequently from gonorrhœal arthritis, no well-established case of gonorrhœal keratosis in women has been observed. It is noteworthy that the skin appendages—the nails and hair—have been affected in a considerable proportion of cases, the nail being thickened or exfoliated and the hair shed.

Treatment.—The patient must always be confined to bed. For the urethritis local douches of **Potassium Permanganate** 1–8000, or **Argyrol**, or **Protargol**, combined with **Prostatic Massage**, have been

recommended. For the arthritis, tapping of very swollen joints may be necessary; for lesser degrees, **Hot-air Douches, Passive Movements,** and **Hyperæmic Methods** may be used. The keratosis is benefited by applications of **Boric-starch Poultices,** by occlusive wet dressings, and by soaking in **Alkaline Baths,** and some authorities are of opinion that its development may be prevented by personal cleanliness. All the symptoms, however, are best and most speedily mitigated by judicious **Vaccine Therapy.** Two schools of practice exist: one, which favours small doses, begins with half a million and increases this, with doses at short intervals, up to 10 million; the other school gives a much larger initial dose, 50 or 100 million, with a weekly increase, ultimately up to 1000 million or more. When urethral flow is present, its nature should be determined, and, if characteristic gonococci are found, an autogenous vaccine should immediately be made and used. When the gonorrhœal nature of the flow is established by previous evidence, but gonococci are unobtainable, a stock vaccine should be used, and this is almost, if not quite, as effective as the autogenous variety.

Prognosis.—This is unexpectedly good in view of the formidable clinical picture. Vaccine therapy has materially lightened mortality and cut short the duration of the disease.

References.—[1]*Jour. Cutan. Dis.* 1916, Dec., 817; [2]*Jour. Amer. Med. Assoc.* 1917, i, 1169; [3]*Brit. Jour. Derm.* xxix, 107; [4]*Pract.* 1916, ii, 531; [5]*Brit. Jour. Surg.* 1918, *No.* 19, 389.

KIDNEY, DISEASES OF. (*See* Nephritis; Renal Function Tests.)

KIDNEY, SURGERY OF. *J. W. Thomson Walker, M.B., F.R.C.S.*

Bugbee[1] concludes, after an exhaustive review of the literature, that the comparatively small number of recorded cases of *traumatic injuries to the kidneys and ureter* may be accounted for by failure in diagnosis, and the fact that many cases are regarded as cured when temporary amelioration of symptoms has followed rest and expectant treatment. He suggests that many cases of supposed neurasthenia may be due to injuries to the kidney. In the diagnosis, too much reliance should not be placed upon the absence of cardinal symptoms.

Misuraca[2] publishes the results of an experimental research into the lesions caused by suturing the renal parenchyma. In his experiments he never observed abundant or persistent hæmaturia, fistula, urinary infiltration, calculus formation, cystic dilatation of the tubules, or other complications. The alterations observed in the kidney itself were almost inappreciable macroscopically. Permanent changes were found around suture points in the parenchyma, consisting in necrosis and consecutive inflammatory reaction. This causes a gradual disappearance of specific glandular elements, and their replacement by scar tissue. There is a limited sclerotic zone which follows the path of the thread. In the renal parenchyma involved by the restricting thread, there are circulatory disturbances, stasis, and dilatation of the glomeruli, and reactionary alterations in the parenchyma, as shown

by tumefaction and, later, degeneration of the cortical epithelium. In short, there is a zone of parenchymatous nephritis, which attains its maximum in about twenty to twenty-five days. These changes are not permanent: they gradually disappear, leaving only slight traces. He concludes that suturing through the renal parenchyma, far from causing the grave alterations described by certain observers, is generally exempt from important complications, and does not compromise the general functional power of the organ.

Eisendrath and Schultz[3] publish a report on a study of the *route of infection* which takes place in an ascending direction along the interstitial lymphatics of the ureter. The organisms employed for experiment were the *Bacillus coli*, *Staphylococcus aureus*, and *Bacillus proteus*. An emulsion was made of the organisms in salt solution, and was injected into the bladder of a female animal, under aseptic precautions, and without producing injury. Of 26 dogs used, 21 showed ureteral involvement, 16 pelvic involvement, and 13 lesion of the kidney. The following conclusions are drawn: Infection of the bladder or lower ureter may reach the renal pelvis or the kidney, either by way of the lumen of the urinary tract, or by way of the normal lymphatics. Experimental and clinical evidence indicate that almost complete obstruction to the free passage of urine is necessary for ascent of infection by way of the lumen of the urinary tract. Experimentally, the authors claim to have shown that infection set up by the simple introduction of bacteria into the bladder, without injury or obstruction, may pass upward by means of the interstitial lymphatics of the ureter. The degree of involvement following the introduction of bacteria into the bladder depends upon the virulence of the organism and the susceptibility of the animal. The subsequent tissue reaction may remain limited to the tissues of the renal pelvis, or even the parenchyma of the kidney. From the kidney the peri-renal tissues may become involved through the capsular lymphatic. The experimental evidence indicates that in cases of pyelitis and pyelonephritis in the human body, secondary to infection of the bladder, the lymphatics constitute the most important cause of the upward travel of infection, especially in those cases where there is no hindrance to the urinary outflow. Pyelitis and pyelonephritis, not secondary to cystitis, may also be the result of lymphatic transport of infection from the pelvic organs in the male and female, and from the lower intestinal tract

In discussing this contribution, Cabot pointed out that organisms had not been demonstrated between the bladder and the kidney, and further, that the lymphatic system of the ureter is segmented, and that there is nothing approaching a continuous chain of lymphatics for any considerable distance. The lymphatic vessels leave the ureter and go to the lymph nodes, and the organism would have to leave the lymph nodes and return to the ureter again. The work was interesting in showing peri-ureteral, perivesical, and peripelvic lesions, but there was a lack of evidence showing how these lesions were pro-

duced, and it had not been demonstrated that they bore any relation to the bladder. Crabtree pointed out that, although pus-producing organisms had been used, there had been no note of changes in the regional lymphatic glands ; and further, that the lesions in the peri-ureteral tissues were those of chronic inflammation, and not those of acute inflammation, as should be the case. There was in those experimental cases no evidence of invasion of the urine, such as would be produced if the mucosa were infected.

R. W. Smith[4] reviews the subject of *pyelitis of infancy*. In uncomplicated cases the pelvis alone is involved, the lesion being a low-grade inflammation. Many cases show, in addition, degenerative changes in the kidney substance, due to extension of the process from the pelvis. In regard to the mode of infection, Smith holds that the theory of ascending infection, so far as it applies to the pyelitis of infancy, has not been proved, and the facts are against it. The intestinal tract is the source of infection in the majority of cases, the bacteria reaching the kidney by way of the blood-stream or the lymphatics.

Quinby[5] regards the ascending theory of infection as not entirely disproved. Treatment should be based on a study of the infecting organism ; and the hydrogen-ion concentration of cultures, both of the organism and the urine, should be ascertained, and alkaline or acid treatment adopted accordingly. Quinby favours injection into the pelvis through a ureteral catheter of 0·5 to 1 per cent **Silver Nitrate** in cases that do not clear up in a reasonable time.

Crabtree and Cabot[6] studied the evidence of *immunity production in colon-bacillus pyelonephritis* under three headings, as follows :—

1. Evidence of the natural production of immunity as a result of accidental infection. The normal adult harbouring colon bacilli in his intestine, and subject to occasional wound infection in which this organism may be concerned, is generally recognized to carry about protective antibodies for the common infectional varieties of this organism. The normal resistance to infection may be low at times. These observers have noted that cases of so-called idiopathic colon pyelonephritis, in which there could be demonstrated no abnormality of kidney or lower urinary tract, occurred in patients whose normal resistance had been lowered from overwork, under-feeding, recent or chronic illness, recent pregnancy, or acute intestinal disturbances. They also hold that prostatics, operated on within three or four weeks after a pyelonephritis, are better operative risks, owing in great measure to acquired immunity.

2. Evidence of artificial production of immunity in chronic pyelitis by use of vaccines. It is extremely unlikely that immunity conferred by recent infection, while largely responsible for the course of the disease, is at all lasting. It is recognized that vaccine treatment of these cases, while beneficial to symptoms, is, as a rule, not curative of the condition. This fact is not surprising in view of the authors' belief that the lesion of the kidney is chiefly of the mucosa rather than of the renal tissue. They know of no evidence that bactericidal

products in the blood reach the urine as such, save in rare instances, and then in amounts insufficient to produce beneficial effects.

3. Evidence of artificial production of immunity in uninfected cases, with the aim of preventing infection as a complication of operation. The prostatic with uninfected urine, who undergoes some form of drainage preliminary to operation, either with inlying catheter, suprapubic puncture, or the two-stage operation, almost without exception shows some rise of temperature during the periods of drainage, often presenting symptoms of acute pyelonephritis. The chief element of danger is renal infection, and the authors have tried to eliminate this by administering mixed colon vaccines during the periods of preliminary preparation. The administration of vaccines in prostatics should be made to extend over the period of convalescence. While the colon bacillus is not the only organism concerned in renal and bladder infection, it is the permanent infection, and, if avoided, the patient is usually able to deal with the other bacteria.

Newman[7] records a case of *horseshoe kidney* by union of the upper poles, which was diagnosed prior to operation. The amount of fusion in horseshoe kidney varies greatly. The union may be a band extending across the vertebræ and uniting the lower poles, and consisting of a narrow, thin, flat isthmus of connective tissue only, or the union may be made up of a broad band of kidney parenchyma. In a very few instances the upper poles have been found united. Newman's case is an example, and the only one he has been able to discover where the diagnosis was made before operation. Israel diagnosed, prior to operation, a diseased horseshoe kidney where the lower poles were united, and the diagnosis was confirmed. In Newman's case the patient was very thin and slender, and under an anæsthetic a horseshoe-shaped mass could be felt, the bridge joining the kidneys being an inch and a half below the ensiform cartilage. Both limits of the shoe were narrow bands, and extended down to the level of the transverse processes of the second lumbar vertebra. There was a stone in the lower pole of the left kidney. The diagnosis was confirmed by operation.

Krotoszyner[8] describes a case of horseshoe kidney, with bilateral nephrolithiasis, and pyonephrosis on the right side. The patient died a week after operation with symptoms of uræmia and sepsis, and a full investigation of the condition was possible. The kidneys were fused at the upper poles, so that the concavity of the whole mass faced downwards. The connecting bridge was, judging from the illustration, as broad as about two-thirds of the length of the kidney. The ureters lay on the anterior surface of the lower part of this. The two kidneys were displaced inwards and downwards. In the preoperation notes, it is stated that the kidneys were not palpable. Radiography showed typical stone shadows in both kidney regions. Pyelography, although repeatedly done, did not materially aid the diagnosis. The condition was discovered at operation. In reviewing the symptoms of recorded cases of horseshoe kidney, the author finds

the following criteria which might lead to a pre-operation diagnosis : A palpable mass presenting suggestive configuration and position ; the position of *x*-ray shadows of calculi much closer to the spine than normal ; bilaterally symmetrical dilatation of renal pelvis ; marked cardiac symptoms brought about by pressure upon the descending aorta.

In an article on the *removal of stones from the kidney*, W. J. Mayo[9] states that 450 patients were operated on for stone in a period of eighteen years at the Mayo clinic. The mortality was 0·6 per cent. In 48 patients (9·9 per cent) stones were found in both kidneys, and in these cases the stone was removed from the least involved kidney first. In half the bilateral cases the second kidney was pyonephrotic, and nephrectomy was necessary. In three instances stones were found in a single kidney, and in two cases stone was known to recur in the solitary kidney after nephrectomy. Multiple stones in the parenchyma of the kidney are prone to recur. One of the most common causes of recurrence of stone has been due to attempts to conserve a badly damaged kidney which was of little use functionally. Another cause of recurrence is leaving fragments behind in attempts to remove the stone through too small an incision. A third cause is leaving stones not shown by the *x* rays, their indistinguishability being due to their shadow being superimposed on that of the other calculus. The percentage of recurrence of stone after operation is under 10 per cent. In 206 cases the stone was removed by incision in the pelvis. The incision is closed with catgut, and covered with fatty tissue. Drainage of the pelvis is rarely required for uncomplicated stones. If necessary, it should be done, not through the pelvis, but by counter-puncture through one of the calices, preferably the posterior inferior calix. In 34 cases, combined pelviolithotomy—as the author names the operation—and nephrolithotomy was performed. This was used where the communication between the calix and pelvis was so small as to cause fragmentation in attempts at removal, or where much cortical infection was present. Each cavity should be drained separately, and at least one tube should lead to the renal pelvis. Nephrolithotomy was performed in 40 cases, but was seldom required for uncomplicated stones in the pelvis and calices. The objections to it are injury to the kidney, and the liability to secondary hæmorrhage by way of the ureters ; in 4 cases the secondary hæmorrhage was so severe that nephrectomy was required. In 204 cases nephrectomy was performed. In most cases pyonephrosis and stone were present. Stone did not form in the remaining kidney in any of these cases, and there was no sign of renal insufficiency. Subcapsular nephrectomy is frequently required. The difficulty in dealing with the pedicle is overcome by cutting through the reflected capsule at the hilum of the kidney, and securing the renal vessels, a method practised by Federoff.

In a small percentage of cases the exact condition of each kidney could not be determined by the cystoscope and functional tests. In

such cases three methods of exploration may be used: (1) Examination by exploration of the presumably healthy kidney, before operation on the affected kidney; (2) Exposing the affected kidney, and judging from its condition the probable functional capacity of the remaining kidney; (3) Opening the peritoneal angle of the incision, and exploring the second kidney with the hand in the peritoneal cavity. The last method is not of great value unless the kidney felt is grossly affected.

Obesity and deformities, such as hip ankylosis, may hamper the operator. Venous hæmorrhage from large renal veins has been checked by catgut on a fine needle, and injuries to the vena cava can be controlled in the same manner. If renal arteries of large size are injured, it is better to remove the kidney. Injury to the duodenum is a rare accident, and necessitates the opening of the abdomen to deal with it.

Braasch[10] publishes clinical data relating to 450 patients operated on at the Mayo clinic for nephrolithiasis. Mistakes in the use of the *x* rays were of two types—(1) errors in interpretation, and (2) failure to show the stone shadow. Localization of the stone is aided by pyelography. The main problem is, is the stone situated in the true pelvis, in a calix, or in the cortex? If situated in the pelvis, the shadow may be observed by the pelvic outline, and the exact position can be determined only by comparing the pyelogram with the original radiogram. Frequently, however, the stone outline is visible through that of the pelvis. When the stone is situated in a calix, its outline may be seen through that of the calix, which is usually deformed. When situated in the cortex, the stone may be seen clear of the pelvic outline. In the cases other than those in which nephrectomy was performed the situation of the stone was: 180 in the pelvis, 14 in the pelvis and calices, 48 in the cortex, and 8 at the ureteropelvic junction. A single stone was found in 285 operations, and multiple stones in 188 operations. A stone was found in the ureter and the kidney, on the same side, in 26 patients. If found advisable to save the kidney, the ureteral stone should be removed first.

When the function of the kidney is largely destroyed, nephrectomy is indicated as the primary procedure. When a large irregular stone remains in the ureter, it is advisable to remove it at a secondary operation. When the stone is small and the ureter is not extremely dilated, it may not be necessary to remove the stone at all. When there is considerable dilatation of the ureter, it may be advisable to perform uretero-nephrectomy.

The total number of patients, so far as can be ascertained, who have died since operation, is 35. Of this number, 3 died in hospital, an operation mortality of 0·6 per cent. Of 88 patients who were re-examined, 13 (14·7 per cent) had recurrence, but this was certainly higher than the percentage of recurrences in the total number, for all these returned on account of definite symptoms. Of the 13 recurrent cases, 11 were re-operated, and in every case but one the stones recurred in the same portion of the kidney as at the primary operation.

Pilcher[11] records the case of a man, age 41, on whom nephrectomy was performed, and the kidney showed two large sacs entirely independent of each other, each sac having its own ureter. In the lower and larger sac there was a large uric-acid calculus, but there was no calculus in the upper sac. Only one right ureteric orifice was seen in the bladder. Eisendrath, discussing this case, refers to an exhaustive article on the subject of double kidney by Young and Davis, who had collected 24 cases of double kidney operated upon. All the cases showed complete duplication of the renal pelvis, and grades of ureteral duplication varying from duplication close to the kidney to a complete supernumerary ureter with a separate orifice. In 19 out of 24 cases the pathological condition operated for was in the upper segment. In 2 instances the operation was pyelotomy, in 20 a nephrectomy was done, and in one only of these was the nephrectomy partial. Sixteen of the double kidneys were half-normal, and would have afforded an opportunity for partial nephrectomy, with preservation of a normal portion. Such a conservative procedure can only be carried out, however, when there is a more or less complete demarcation between the parenchyma of the two halves, and if the vessels of the two halves can be separated.

Maloney[12] describes a case of moderate *pyonephrosis* in which the patency of the ureter was re-established in the following manner: The kidney was opened, a catheter passed up the ureter from the bladder, and brought out through the nephrectomy wound in the loin. To the end of the catheter a No. 11 catheter was stitched. After removal of the cystoscope, traction was made on the ureteral catheter from below, and the large catheter was drawn down through the ureter, and out of the urethra. Six inches of the catheter were cut off close to the urethra, and a strong plaited silk ligature attached to the cut end. By pulling on the upper end, the lower end was drawn up into the bladder, the silk ligature projecting from the urethra. The catheter in the kidney, ureter, and bladder caused no inconvenience at all, and the bladder was irrigated through the upper end of the catheter. The large catheter was changed every few days by inserting a fresh one over the stilette. The catheter was removed after three weeks. The lumen of the ureter was proved to be freely open a month after, by syringing through the kidney fistula into the bladder.

Thomas and Birdsall[13] record a case in which a calcified plaque in the wall of the internal iliac artery threw a shadow on the *x*-ray plate which was mistaken for a ureteric calculus. On operation, the calcified plaque was found, and the ureter and kidney were found to be tuberculous, and were removed.

A method of **Nephropexy** is described by McKenna.[14] After exposure of the kidney through Petit's triangle, the true capsule is split from pole to pole, and separated carefully on each side down to the hilum. If the capsule be fairly firm and thick, the cuff may be made out of three or four thicknesses of the capsule, by folding it on itself.

Then a mattress suture is introduced through the capsule at the upper and lower poles on both sides of the kidney, making four strong anchor points. If the capsule is thin, it may be necessary to fold it back on both sides to a point at which they come together, this point being above and below the hilum. A mattress suture is then inserted at the upper and lower poles, and used for fixation. The kidney is placed in position, and the capsule is sutured firmly to the muscles. The fatty capsule is picked up, and brought over the denuded surface of the kidney, and sutured to the muscle. One or two sutures are placed in the peritoneum to close the space below the kidney.

Bartlett[15] describes a method of operation for the *fixation of movable kidney*. The method, he says, depends upon the commonly accepted observation that the kidney becomes more movable as an individual's body-fat disappears, and it is known that fat can be successfully transplanted. Von Bergmann's oblique incision is used. The posterior abdominal wall muscles are stripped of fat. The fatty capsule of the kidney is divided longitudinally along the entire length of the organ, and caught in clamps at several points. The exposed kidney is lifted out of the abdomen, and the fatty capsule inverted over on to the pedicle, being divided freely above, so that the inverted capsule lies beneath the lower pole. The cut edges of the capsule are united, and the whole capsule forms a ball of fat constituting a pedunculated flap, which is anchored to the inner aspect of the abdominal wall, immediately under the lower angle of the wound, by a catgut stitch. The posterior abdominal wall is closed in layers, without drainage.

Caulk[16] recommends preliminary **Renal Drainage** by means of the ureteral catheter, in certain cases, before proceeding to operation on the kidney. This method, he believes, may be very effectively employed in unilateral infected hydronephrosis. In such cases draining the hydronephrosis, either intermittently or by retained ureteral catheter, will improve the patient's general condition, relieve the other kidney, and allow its function to recover. Such individuals, he admits, are usually operated on without such preliminary drainage, but he holds that the convalescence is decidedly better when they are drained in this way. Another type of case in which he recommends preliminary ureteral catheter drainage is acute unilateral pyonephrosis "in individuals who are acutely sick and extremely toxic." Bilateral renal drainage he recommends chiefly in calculous pyonephrosis, in patients where the combined renal function is low. A two-stage operation on the kidney is recommended in cases of large pyonephrosis in children with high fever and profound toxæmia. A secondary nephrectomy is performed in from two to four weeks. The two-stage operation is most useful in bilateral calculous pyelonephritis, or pyonephrosis.

Wohl[17] states that *malignant papillary adenoma* of the kidney is very rare, and describes a case. There are no symptoms which permit of a clinical diagnosis of this type of renal growth from others.

Braasch[18] tabulates the clinical data of *polycystic kidney*, based on the records of 41 cases at the Mayo clinic. Pain was not severe unless there was urinary obstruction or infection superadded. Hæmaturia occurred in 16 cases (40 per cent). It was usually profuse, and continued from several days to several months. Clot colic might result. The clinical symptoms of renal insufficieney in polycystic kidney differ in many respects from those occurring with nephritis. In most cases the only evidence during several years is nausea and vomiting. Cardiac disease occurred infrequently, and was a terminal complication. Œdema of the extremities was observed. Blood-pressure was normal in 7 out of 16 observed cases, and raised to a varying degree in 9. Of 4 patients with a systolic pressure of over 200, 2 died as the result of operation. An extremely high systolic and diastolic blood-pressure, with a specific gravity as low as 1003 or 1004, and only a trace of phthalein, should contra-indicate even a Rovsing operation. Red blood-cells were not always present, but a large number of cases showed a small amount of microscopic pus. A few hyaline casts were present in only 5 cases. Ophthalmoscopic examination was negative in every case. A renal tumour was detected in 31 of the 41 patients. In 3, enlarged kidney was mistaken for a tumour of the liver or gall-bladder. A bilateral tumour was detected in 18 of the 31 recognized renal tumours. There was a deformity recognized by pyelography in more than 50 per cent of cases. Nephrectomy was performed in 14 cases. One patient died as the direct result of the operation. Of the 13 cases, 10 were traced, and all were alive except one who died of " pelvic malignancy " three years after nephrectomy. The time since operation was one year in two cases, two years in two cases, three years in two cases, four years in three cases, and ten years in one case. " The good results following nephrectomy are remarkable, and demonstrate very clearly that nephrectomy can be performed if the function of the remaining kidney warrants it." [This is surely somewhat misleading. The expectation of life in cases of polycystic kidney, without nephrectomy, is certainly well over four years after the tumour has been recognized. —J. W. T. W.] The Rovsing operation (incision of the cysts) was performed in 10 patients. Two patients died as a result of the operation, and one three years later. After the operation the kidney tumour becomes greatly reduced in size, but may again increase.

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KIDNEY, TUBERCULOSIS OF. (*See* Tuberculosis, Renal.)

LABOUR. (*See also* PREGNANCY.) *W. E. Fothergill, M.D.*

Cæsarean Section.—J. C. Hirst[1] approves the tendency to widen the indications for delivery by the abdominal route. He prefers it to the high forceps operation for disproportion between the head and the pelvis, and advises it for breech cases when the pelvis is small or considerably deformed. Prolapse of the cord, placenta prævia—especially in primiparæ—and accidental hæmorrhage are also allowed as good indications. For different cases he regards different techniques as essential, and he distinguishes five methods: (1) Old Cæsarean with eventration of the uterus; (2) Modern short incision, opening the uterus *in situ*; (3) Extraperitoneal Cæsarean; (4) Supravaginal hysterectomy; (5) The Porro operation, namely supravaginal hysterectomy with the stump of the cervix fixed extraperitoneally in the lower angle of the wound.

Whitridge Williams[2] writes a warning against the abuse of Cæsarean section by performing it (1) without necessity, and (2) at the wrong time, namely, too late. He considers that the test of labour would show that many deformed or small pelves which are said to require Cæsarean section will really admit of delivery *per vias naturales*. As to placenta prævia, he finds the mortality less when the older obstetric methods are used than when laparotomy is done. In eclampsia, abdominal section is occasionally (say 1 in 15 to 20 cases) indicated in primiparous women, but vaginal hysterotomy is preferred when the vagina is large enough. In brow, breech, and transverse cases, Cæsarean section is an abuse unless the pelvis is seriously contracted, the exception, perhaps, being neglected transverse cases. In these, Porro's operation is legitimate if the woman already has children. Williams deprecates the 'preposterous' proposition to treat occipito-posterior positions by Cæsarean section, and also condemns the operation for women who are constitutionally unfit for childbearing. This is a paper of great weight, both because it is closely reasoned, and because there is no greater authority than its author.

Newell[3] is one of those who hold that a previous Cæsarean should always be followed by others in subsequent pregnancies. He includes primiparous women over forty as proper cases for abdominal delivery, because they are not likely to have more children and may be severely lacerated in vaginal delivery, while the child's life is also exposed to more risk if it has to pass through the bony pelvis and rigid soft parts.

Losee[4] has studied the uterine scar left after Cæsarean section. He finds the strength of the scar depends upon the absence of infection during healing and upon the perfect coaptation of the cut surfaces. The best scars leave the uterine wall as strong as it was before. The placenta in a subsequent pregnancy has little or no effect in weakening a good scar. There is a small amount of fibrous tissue under the peritoneum, but otherwise the union is muscle to muscle without the intervention of scar tissue. Rupture occurs not beside but through the site of the scar. During subsequent pregnancies the uterus should be kept under careful observation as full term is approached.

Palmer Findley,[5] writing on the same subject, says that it must be admitted that there is no positive assurance of obtaining perfect wound healing whatever the method of suturing or whoever the surgeon. The uterine scar is an unknown factor in all cases. Thus, though a good scar will hold in a subsequent labour, the utmost caution is required in every pregnancy and labour following a Cæsarean section. All such cases should be delivered in hospital, the Cæsarean section being repeated if any mechanical obstruction exists, or if the uterine scar is ascertained to be defective. But, in view of the evidence that not more than 2 per cent or 3 per cent of ruptures occur in subsequent labours, we are not justified in voicing the slogan, " Once a Cæsarean section, always a Cæsarean section."

Mason,[6] describing and discussing a number of cases of normal labour following Cæsarean section, concludes that if the advantages of the improved technique of the present day are employed, and the convalescence is free from infection, the Cæsarean scar is strong enough to withstand the distention of a full-term pregnancy and the strain of labour. Several other writers are of the same opinion after careful consideration of the literature.

Post-mortem Cæsarean Section.—Pfaff[7] finds that out of 331 cases previous to 1900, only 6 or 7 living children were secured ; but out of 52 more recent cases, the child was saved alive in 22, or 42 per cent. This writer sympathizes with the suggestion that in certain pregnant women at or near term who are known to be dying, the child should be delivered by Cæsarean section without waiting for death. It is not legal to do a post-mortem section without the consent of the relatives ; thus a medico-legal question arises. The *lex regia* of Numa Pompilius, the second king of Rome, provided that all women dying at the end of pregnancy should be opened. A legal opinion recently given in New York was to the effect that the law would protect the medical man in cases of this kind. An old Austrian law makes post-mortem delivery compulsory in order that the child may be baptized.

Occipito-posterior Positions.—Peck[8] finds that in obstetric works description of the technique of digital rotation is very meagre ; also that the utilization of the sutures of the fœtal head is not advocated. He says the palmar surface of the index or middle finger (or both) should hook, as it were, on to the bony ledge of the anterior arm of the lamdoid suture, and endeavour to move it upward or forward in the direction in which the occiput should rotate. The right hand or the left should be employed according to the position of the vertex. Most obstetricians find it more efficacious to put the whole hand in the vagina and grasp the head, meanwhile working upon the body of the child through the abdominal wall with the other hand.

De Lee[9] uses a vulsellum or an ordinary 8-in. artery clamp for taking hold of a bit of the scalp when bringing the occiput to the front in occipito-posterior cases. He used to find difficulty in keeping the occiput forward after manual rotation, so began fixing it by grasping

a bit of scalp with the vulsellum. Then he found this was the best means of bringing about the desired rotation as well as of preserving the occipito-anterior position when once it had been secured. De Lee uses the same device in converting brow and face presentations into vertices. "Naturally such a delicate proceedure must be done with art, not with strength, a statement which applies to all manipulations in obstetric surgery."

The Contraction Ring.—Further attention has been given to cases in which labour is obstructed by the formation of a 'contraction ring' as distinguished from the 'retraction ring.' Hicks reported two cases of this kind in 1906, and Clifford White[10] wrote on this subject in 1912. Dickenson has collected 90 cases. Hicks[11] and Clifford White[12] have returned to the subject recently. The text-books do not as yet give much information; we therefore quote White's table showing the differential diagnosis.

Contraction Ring.	*Retraction Ring.*
1. A localized thickening of the wall of the uterus due to the contraction of the circular fibres over a point of slight resistance, most frequently over a depression in the child's outline or below the presenting part.	1. The junction of the thinned lower uterine segment with the thick retracted upper uterine segment.
2. The uterine wall at the site of the contraction ring will therefore be thicker than it is either above or below.	2. The uterine wall above the retraction ring is much thicker than it is below it.
3. The wall below is neither thinned nor over-distended.	3. The wall below is both thinned and over-distended.
4. The presenting part is not forcibly driven into the pelvis.	4. The presenting part is or has been jammed into the pelvis.
5. The child may be wholly or mainly above the contraction ring.	5. Part of the child must be below the retraction ring.
6. The body of the uterus above a contraction ring is usually relaxed and not tender.	6. The body above a retraction ring is tonically contracted and hard.
7. Round ligaments are not tense.	7. Round ligaments stand out.
8. A contraction ring may occur in the first, second, or third stage of labour.	8. A retraction ring practically always occurs late in the second stage of labour.
9. A contraction ring does not vary in position as labour goes on.	9. A retraction ring gradually rises as retraction of the upper uterine segment proceeds.
10. A contraction ring is rarely felt on abdominal examination.	10. A retraction ring may frequently be felt.
11. The patient's general condition is good.	11. The patient's general condition is bad.
12. *Causation.* — Premature rupture of the membranes. Intra-uterine manipulations.	12. *Causation.*—Obstructed labour.

The position of the ring is, roughly speaking, round the neck in 45 per cent, below the whole of the child in 21 per cent, round the arm in 15 per cent, round the thorax in 9 per cent, and round the after-coming head in 9 per cent of recorded cases.

In slight cases manual dilatation has sufficed. Forceps are quite unsuitable; embryotomy is difficult and dangerous. Continuous weight traction has been successful. White's cases in 1912 showed a mortality of 7 out of 19 cases delivered by laparotomy. Adding three cases of Hicks's and another of his own, it would be 9 deaths out of 23; but in many of these cases it was done too late. If done early there is no reason why the mortality of Cæsarean section for this condition should be higher than that of the same operation done for contracted pelvis.

Scopolamine and Morphine.—Several further communications on 'twilight sleep' have appeared, including a symposium by eight writers in the *Practitioner*.[13] The uses and the disadvantages of the method are gradually being brought out, and it is evidently seen at its best in maternity homes where patients can be attended by a medical man who devotes his time more or less completely to work of this kind. The lack of quiet and seclusion, and the amount of attention demanded, militate against the success of the method in hospitals, and financial considerations will prevent its general use in private practice. (*See also* MEDICAL ANNUAL, 1917, p. 325.)

Mundell[14] gives another year's statistics on **Pituitrin,** which show that the drug is still being very freely abused. The writer says that the child has a right to be born alive, and that the licence to practise medicine does not also carry with it a licence of executioner of the unborn child any more than of the mother.

A Comparison of Statistics of 1914 *and* 1916.

1914.	1916.
Cases, 3,952.	Cases, 1,293.
Ruptured uterus, 8 cases, or 1 rupture in every 494 cases.	Ruptured uterus, 12 cases, or 1 rupture in every 106 cases.
Fœtal deaths, 27, or 1 fœtal death in every 146 cases.	Fœtal deaths, 34, or 1 fœtal death in every 38 cases.
	Asphyxia pallida, 1 case in every 32.

Pituitary extract, he says, probably has a place in the obstetrician's armamentarium, but because of its undoubted bad effects on the child primarily, and on the mother in a lesser degree, it would seem that its field of usefulness is indeed a limited one. Statistics here, as in all such subjects, are not to receive too great consideration, but still they certainly do give some idea of the rôle pituitary extract is playing.

Stein[15] criticizes Mundell's figures, and advocates the routine use of small doses of pituitrin for reducing the length of normal labour, using it during the first stage as well as later. He also employs it for the induction of premature labour. The usual dose is 2 or 3 min.; these

may be repeated at intervals of half an hour. The author's average number of doses per case is 1·78. To induce labour, 1 oz. of castor oil is given at 7 a.m., 2 min. of pituitrin at 9 a.m. and at 11 a.m. If labour begins, the pituitrin is continued, 2 min. every half-hour. If labour does not begin, the same treatment is tried again on the third day. Out of 34 cases, 17 were successful, and the author appears to be satisfied with this moderate achievement, in which the castor oil no doubt played a part. (*See* MEDICAL ANNUAL, 1917, p. 327.)

REFERENCES.—[1]*Amer. Jour. Obst.* 1916, ii, 784; [2]*Surg. Gyn. and Obst.* 1917, ii, 194; [3]*Jour. Amer. Med. Assoc.* 1917, i, 604; [4]*Amer. Jour. Obst.* 1917, ii, 1; [5]*Ibid.* 1916, ii, 411; [6]*Boston Med. and Surg. Jour.* 1917, i, 127; [7]*Amer. Jour. Obst.* 1916, ii, 967; [8]*Ibid.* 1917, i, 643; [9]*Ibid.* ii, 15; [10]*Proc. Roy. Soc. Med.* 1913, Jan.; [11]*Brit Med. Jour.* 1916, ii, 515; [12]*Ibid.* 752; [13]*Pract.* 1917, i, 1; [14]*Jour. Amer. Med. Assoc.* 1917, i, 1601; [15]*Med. Rec.* 1917, ii, 238.

LABYRINTH, DISORDERS OF. (*See* EAR.)

LARYNGOSCOPY, BRONCHOSCOPY, AND ŒSOPHAGOSCOPY.

J. S. Fraser, M.B., F.R.C.S.

Suspension Laryngoscopy.—Clyde Lynch[1] gives an account of a year's work with his suspension laryngoscopy apparatus. The latter appears to be a great improvement on the pattern originally devised by Killian. Recent additions are: (1) A strap placed under the occiput and clamped into the angles of the pear-shaped ring: (2) A dental-impression spoon filled with moulding compound to make an impression of the entire upper jaw, including the hard palate. This is fixed to the gag, and gives complete protection to the teeth, absolutely equalizing the pressure upon the oral surface of the upper jaw, and markedly facilitates the introduction of the spatula. Two sizes only are necessary, one for adults and one for children. Lynch's operating table can be easily raised or lowered. Foot and shoulder braces are so arranged as to fix the patient both comfortably and rigidly. The shoulder braces effectually prevent the patient slipping off the table.

Ten cases of *intrinsic epithelioma of the larynx* have been operated on in the last four years—five of them with success—with the aid of the above apparatus. The dissection under suspension is not difficult, and can be done without permitting an instrument to touch the tumour mass, can include the perichondrium, and does not require much time. There is no excessive bleeding. No case has had any post-operative disturbance. Numerous *non-malignant papillomata* have been removed by dissection, with no recurrence in a single case so far. The mass is picked up and dissected well from the base from which it grows. To be more certain, the base is curetted and painted with pure alcohol. The wound is dressed with compound tincture of benzoin.

In children and infants, Lynch[2] has made use of his suspension method and apparatus for introducing and manipulating broncho-

scopic and œsophagoscopic tubes. Infants and young children are the most ideal subjects for suspension, because of their muscular undevelopment, their flexible necks, and the short distance from the upper teeth to the larynx. It is in these young patients that the greatest number of our foreign-body cases occur, and it is in these also that we most fear the reactive inflammations and swellings due to our manipulations. When the bronchoscope is used, it is not uncommon for the surgeon to remove the foreign bodies successfully, only to be called again to relieve the subglottic œdema by a tracheotomy. Per-oral endoscopy is the procedure of election in infants and young children, provided one has developed a technique which will permit the passage of the tube through the glottis with the least amount of traumatism. Suspension aids this to the greatest degree. Lynch agrees with Jackson in his postulate, "No anæsthesia in young children, and never in infants." For bronchoscopy in infants and young children the head of the table is not dropped. Just sufficient extension is effected by moving the horizontal crane outwards to bring the posterior two-thirds of the larynx into view; then the neck is straightened by the elevation of the travelling crane, and we have the posterior two-thirds of the larynx well in view, in many instances with the child's head hardly elevated from the table. The child is prepared by being wrapped firmly in a sheet and the crane so adjusted that we may procure flexion of the head rather than extension. We do not desire to see the anterior commissure, but only to gain sufficient room for the passage of the tube. Lynch prefers to introduce the spatula so that it picks up the laryngeal face of the epiglottis and brings into view the interior of the larynx. Five per cent cocaine is now applied to the upper part of the larynx only. The surface of the larynx and vocal cords is next covered with sterile vaseline to permit the smooth passage of the tube. It is now an easy matter to slip the bronchoscope or œsophagoscope into its respective opening without injuring the parts. Lynch prefers the Killian baby set of bronchoscopic tubes, because they are equipped with a hollow smooth mandrin which causes no injury. Further, these tubes give the largest working lumen. The tube should be well greased, and the cords separated by a retractor. In this way the tube can be passed into the trachea without coming into contact with the subglottic space. Once the tube has passed the vocal cords, the mandrin is removed. Two courses are now available: (1) If it is probable that the tube will have to be removed and re-introduced, as in the case of multiple foreign bodies, it is best to continue the patient in suspension. (2) If, on the other hand, one prefers to use the tube unaided after its passage through the cords, the hook of the suspension apparatus is removed from the crane and carefully tilted to the right to permit the removal of the left tooth-plate; then the right tooth-plate is removed in the same manner. The pear-shaped ring of Lynch's apparatus is now bent back upon its hinge, and the screw holding the spatula is loosened. In this way the body

of the hook is disengaged from the spatula, so that the latter can be finally removed. [It must be noted that Lynch's article applies only to his own apparatus for suspension, and that his technique is not suitable for the suspension laryngoscopy apparatus of Killian—the one usually employed in this country. Lynch's apparatus certainly allows much more working space, and thus facilitates the passage through it of bronchoscopic or œsophagoscopic tubes.—J. S. F.]

Mechanical Problems of Bronchoscopic and Œsophagoscopic Foreign-body Extraction.—Chevalier Jackson[3] remarks that, when a bronchoscopist first catches sight of a foreign body for which he has been searching, there is a great temptation to seize it by whatever part is visible and to pull on it with all the strength of which his forceps are capable. Hasty injudicious extraction of this kind very often fails to remove the foreign body, and so complicates the situation as to render subsequent removal very difficult, just as pulling on a tangled mass of string will render subsequent disentanglement difficult or impossible. Jackson has now successfully removed 543 foreign bodies from the œsophagus, larynx, trachea, and bronchi, out of 555 cases. Seven patients died within a week of operation, but six of them were in bad condition when admitted. Only one death could be attributed directly to bronchoscopy. In a large proportion of the successful cases, removal had already been unsuccessfully attempted.

Jackson calls attention to the advantages of *small tubes.* A tube that fills the entire lumen of the bronchus has no lateral range of motion, while a relatively small tube has a useful range. As endoscopic instruments (other than tubes) are necessarily long and slender, the distal ends are not susceptible of a useful degree of lateral movement. Hence the advantage of using small tubes. A foreign body in the lower air-passages is never still for a moment, e.g., a pin may be completely hidden in a small bronchus into which the bronchoscope cannot enter, but from which the point of the pin may be protruded during bechic, respiratory, or pulsatory movement. Such movements may therefore be sometimes of advantage, but more often they are a great hindrance. Jackson finds that the röntgenologist now usually produces a radiogram which shows not only the foreign body, but a sufficient outline of the bronchi to enable the endoscopist to formulate a plan of removal. In all cases both an anteroposterior and a lateral view should be taken. When introducing the tube, the region of the foreign body should be carefully approached, so that the tube-mouth does not touch the foreign body until after its size, shape, and position have been studied. Careless swabbing may force the foreign body downwards. *Objects with a thick conical end* are difficult to grasp because the forceps are prone to slip. If the jaws of the forceps are slightly cup-shaped, this tendency is diminished. Further, if the teeth of the forceps are properly made, the foreign body can usually be firmly held. *Irregular objects* frequently require to be turned so as to present a favourable surface for the grasp of the forceps. *Sharp-pointed bodies,* such as needles and pins, show a

strong tendency (1) to become embedded, (2) to transfix crosswise, and (3) to work lower and lower into the air-passages by a ratchet-like action. To pull on such bodies almost invariably results in fixation or laceration. It is necessary to get the sharp point into the mouth of the tube before any traction whatever is made. In order to disengage the point, it is often necessary to push the foreign body downwards. One of the most difficult things to deal with is an *open safety-pin* in the œsophagus with its point upward. If the *x* rays show that the point is outward and to the left, the endoscopist should bear in that direction with the tube-mouth so as to bring the point into view. This enables him to seize the pointed end and draw it within the tube-mouth. *Hook-shaped bodies*, such as small dentures or bits of wire, usually require to be pushed downwards to withdraw the point of the hook. *Tightly-fitting cord-like bodies* are difficult to remove. In dealing with them, the lip of the bronchoscope should be pressed sideways to permit the insinuation of a hook past one side of the foreign body. The hook is then turned, and the foreign body pulled on sufficiently to withdraw it into a more roomy region where it can be seized with forceps. *Soft friable substances*, such as beans, are difficult to remove without crushing. Jackson has dealt with 62 such cases, and has had no operative mortality; but, by following up his patients, he found that two had died of septic pneumonia a number of weeks later. Jackson remarks on the frequency with which he has had to remove *bits of bone* from the air and food passages, and states that almost criminal carelessness is indicated on the part of the butcher or the cook. If the piece of bone is of enormous size and very sharp, general anæsthesia may be necessary in order to produce relaxation and prevent laceration of the gullet.

Œsophagoscopy.—Irwin Moore[4] points out that œsophagotomy for foreign bodies is followed by a mortality of from 12 to 20 per cent—i.e., nearly ten times as great as that following extraction by œsophagoscopy. Killian has expressed the opinion that "if a foreign body is large, has sharp edges or hooks, all attempts at extraction by œsophagoscopy are dangerous, and may easily lead to fatal injuries of the gullet and adjoining parts. In such cases œsophagotomy is indicated if the foreign body is situated no deeper than 24 to 26 cm. (10 in.) from the upper incisors; if deeper, gastrotomy or posterior mediastinotomy is called for." Judging by recent improvements in instruments and technique, Moore considers that there appears to be no reason why any swallowed foreign body which has not passed into the stomach should not be retrieved *per vias naturales*.

Yankauer[5] holds that stricture of the gullet of spasmodic origin may simulate carcinoma so closely that an experienced surgeon may be led into error. In one case thoracotomy was performed, only to reveal a perfectly normal œsophagus. The stricture was due entirely to spasm, and there was no disease of the œsophagus, either in the neighbourhood of the stricture or elsewhere throughout its lumen. The spasmodic obstruction was in the neighbourhood of the aortic

arch, and was so powerful as to prevent the passage of the œsophagoscope under local anæsthesia. When, however, the patient was œsophagoscoped under general anæsthesia, no sign of the stricture could be seen.

References.—[1]*Trans. Amer. Laryng. Assoc.* 1916, 158; [2]*Laryngoscope*, 1917, July, 533; [3]*Jour. Amer. Med. Assoc.* 1917, i, 245; [4]*Lancet*, 1916, i, 992; [5]*Amer. Jour. Surg.* 1917, March, 55.

LARYNX, AFFECTIONS OF. (*See also* Laryngoscopy, Etc.)

J. S. Fraser, M.B., F.R.C.S.

War Wounds of the Larynx and Trachea.—Moure and Conuyt[1] state that laryngo-tracheal injuries, according to military statistics, are not frequent. In the present war an approximate percentage only has been established. Wounds of the neck may be taken as about 3 per cent of the total wounds. From an experience of several thousand wounded, the authors have found only about 30 wounds of the larynx and trachea.

The immediate results of laryngo-tracheal injuries are hæmorrhage, emphysema, asphyxia, and sudden death. In the great majority of penetrating wounds of the laryngo-tracheal tract, the respiration was interfered with to such an extent that tracheotomy was necessary to save the life of the patient. Besides this preventive tracheotomy, the wound, as is the common practice in all war injuries, must be opened up and cleaned, foreign bodies being removed. These procedures of tracheotomy and cleansing constitute the immediate treatment of such injuries.

The remote results of these injuries are classed by the authors as: (1) Œdema of the laryngeal mucosa; (2) Suppurations; (3) Inflammatory stenoses; (4) Paralyses. Such results may necessitate a secondary tracheotomy. This should be systematically performed. Intercricothyroidean laryngotomy ought never to be done.

Laryngo-tracheal cicatricial stenoses are a frequent result of war wounds. They include: (1) Circular or membranous stenoses; (2) Tubular stenoses; (3) Complications, such as perichondritis, etc. They should be treated by tracheo-laryngostomy according to the special technique of the writers. Only when the surgeon is quite assured that cicatricial retraction has terminated, and that laryngo-tracheal permeability is perfect, should any plastic procedures be attempted.

The authors describe the detailed technique of Moure's special laryngo-tracheal autoplasty. This consists in making two cutaneous flaps around the laryngo-tracheal opening. These flaps are superimposed on each other so as to form a double layer over the opening. The authors state that the cicatricial laryngeal stenoses of war are quite different from those observed in peace, and that the prognosis is much more serious.

Tuberculous Laryngitis.—Dworetzky[2] states that the early detection of the pulmonary lesion has in most cases enabled us either to

cure the lesion or at least check its progress. The early diagnosis of laryngeal tuberculosis, however, is still being neglected. Advanced laryngeal involvement could often be avoided if treatment were instituted in the early infiltrative stage. Tuberculosis of the larynx is invariably secondary to pulmonary tuberculosis, and the recognition of a lesion in the larynx is much easier than the detection of one in the lung. *Routine laryngoscopic examination should be carried out in every case of pulmonary tuberculosis, even when laryngeal symptoms are entirely lacking.* The laryngologist may often be misled by the absence of a history of lung disease and by the excellent general condition of the patient. Such errors can be avoided by a thorough chest examination and by repeatedly examining the sputum. No case of tuberculosis of the larynx should ever escape the observation of a sanatorium physician.

Symptoms.—Cases of tuberculous laryngitis present subjective and objective symptoms. The former may be divided into two groups, those of the early, and those of the more advanced stages. The most common symptom in the early stage is hoarseness (82 per cent). It often begins with slight huskiness of the voice in the morning, gradually disappearing during the course of the day. This hoarseness is most commonly due to infiltration of the posterior commissure, or of one or both cords, and often to a combination of both. The next most frequent symptom is a sense of discomfort in the larynx (60 per cent). The sensation may be described as a lump in the throat, desire to clear the throat, feeling as if a hair were lodging in the throat, dryness or hypersecretion, burning, rawness, or sticking pain. Dysphagia and aphonia are both uncommon in early cases. In the more advanced stages hoarseness is present in 95 per cent, discomfort in 86 per cent, dysphagia in 17 per cent, and aphonia in 18 per cent.

Differential Diagnosis.—(1) *Bronchiectasis and lung abscess.* A large majority of patients with bronchiectasis present an appearance in the larynx typical of tuberculosis. The diagnosis can only be made when it becomes established that the patients are suffering from a non-tuberculous pulmonary infection. (2) *Accessory sinusitis.* These cases often present an appearance in the larynx that may lead one to believe the condition tuberculous. There is usually a marked thickening at the posterior commissure. The diagnosis is made by examination of the nose and its accessory sinuses. (3) *Laryngitis sicca.* This condition often accompanies atrophic rhinitis, and the diagnosis is made by recognizing the latter condition. (4) *Lupus* of the larynx is characterized by a warty growth, little ulceration, and marked fibrosis. (5) *Simple hypertrophic laryngitis.* (6) *Syphilis.* Here we have the Wassermann reaction and the therapeutic test. (7) *Cancer.* Removal of a piece for microscopic examination settles the question.

Treatment.—Discussing the respective merits of the operative and the conservative treatment of laryngeal tuberculosis, Begtrup-

Hansen[3] suggests that the laryngologist is apt to take too narrow a view of the disease, forgetting that the ultimate fate of the patient in most cases depends on the pulmonary tuberculosis which is almost invariably associated with the laryngeal disease. During the last two years the author has observed 63 cases of laryngeal tuberculosis at the Silkeborg Sanatorium, the diagnosis of which was based on ulceration, infiltration, and granulation. Only in two cases was the laryngeal a more important factor than the pulmonary affection. In 55 cases the pulmonary disease was in the third, and in 8 cases in the second stage. In 21 cases in which the laryngeal disease was for the most part severe, the patients were much debilitated and febrile. The treatment of the laryngeal condition could therefore be only palliative, and the only operative treatment was an occasional amputation of the epiglottis for dysphagia or an injection of alcohol into the superior laryngeal nerves. Both these measures can, however, be undertaken by the physician with some knowledge of laryngology. In 29 cases of slight laryngeal disease (limited infiltration and superficial ulceration), the only treatment necessary was the local application of **Menthol Oil** or of **Lactic Acid**. Among the remaining 13 cases, in 4 the steadily progressive pulmonary disease was associated with extensive laryngeal disease, for which energetic treatment might have been beneficial. The author, however, confined treatment to the application of menthol and lactic acid, as he foresaw the patients would die in any case. In the 9 other patients there was no improvement in the laryngeal disease, although there was a steady improvement in the pulmonary condition: more energetic measures were therefore adopted, including the use of the **Galvanocautery** and the **Curette.** There was, on the whole, a resulting improvement in the larynx. With this experience the author concludes that *radical operative treatment should be confined to a very few cases, and should be undertaken only when the condition of the lungs is not hopeless.* He has seen several cases in which a too active treatment of the larynx has been detrimental to the lungs and the patient's general health.

Cancer of Larynx: Surgical Treatment.—Mackenty[4] considers only partial and total laryngectomy, and says the attempt to remove malignant growths by intralaryngeal methods is to be condemned. He holds that thyrotomy is an ideal method, but is applicable in only the most incipient cases. His own experience with it has been discouraging, as he has had a large return of hopeless recurrences.

In selected cases Mackenty suggests the use of local anæsthesia until the larynx and trachea have been skeletonized. Thereafter light general anæsthesia is given during the detachment of the larynx and the closure of the pharynx. To avoid pneumonia, blood must be prevented from entering the trachea, the wound be efficiently drained, and the tracheal secretions removed by suction after operation. To obviate sepsis, Mackenty recommends attention to the mouth, with the removal of all diseased teeth. After operation,

the patient is fed by means of a tube which is passed through the nose into the œsophagus and left in place until the wound is healed. If infection does occur, the dressing should be changed every two hours during the day and every four hours during the night. At each dressing a negative-pressure pump is used to remove the tenacious secretion from the trachea.

War Neuroses of the Larynx.—McMahon[5] found that in *shell-shock stammering* there was chiefly a difficulty in the production of the voiced consonants and vowel sounds. It was accompanied in some cases by amnesia. The prognosis was usually good. In mild cases the condition was better left alone, for with improvement in the patient's general condition the stammer disappeared. In more severe cases the patient should be taught to fill the lungs in a proper manner by inferior lateral costal expansion. The next step was to teach the correct position of the tongue and lips, and the distance between the teeth for each main vowel sound. With a little practice the correct production of the vowel sounds and consonants became automatically performed. There were many stammerers whose defect had dated from childhood, but had been intensified by shock. Generally the laryngeal type of stammerer, who had difficulty in producing the vowel sounds and voiced consonants, was more easily cured than the stutterer. (*See also* STAMMERING.)

Functional Aphonia.—The treatment of this condition was more difficult in soldiers than in civilians, because the original cause was more severe and the treatment was attempted too soon. *Complete rest in hospital and subsequently at a convalescent home should precede treatment*, for the longer the aphonia had existed the easier was it to cure. Perfectly performed breathing movements were of special use in shell-shock cases.

Liébault[6] says that among the men who have lost their voice in the war, some attribute their aphonia to nervous traumatism caused by the explosion of shells. In most cases, however, the affection comes on gradually without shock. There are some in whom examination of the larynx shows simple lesions of overstrain of the voice, or chronic laryngitis. A course of phonetic re-education effects a cure and prevents discharge from the army. Beginning in a cold, which developed into bronchitis and laryngitis with cough and hoarseness, loss of voice supervened. Tuberculosis is suspected, but no bacilli are found, and the man is sent to be treated for laryngitis. In some the mirror shows at first sight a normal state of things; it is only when an effort is made to produce the voice that it is seen that the vocal cords do not approximate. Such a case is now seen to be one of pure nervous aphonia, curable by ordinary care and re-education.

There are other cases which may give rise to the suspicion of incipient tuberculosis. The upper orifice of the larynx is sometimes swollen, and the interarytenoid region looks thickened; the ventricular bands are also tumefied, but there is no pallor of the velum. The swelling of the ventricular bands is a thickening rather than an

infiltration. The mucous membrane covering the arytenoid cartilages look healthy; the aryepiglottic folds do not show the puffiness characteristic of bacillary laryngitis. The vocal cords are often white, sometimes a little rough and reddened, but they never present erosions. Lastly, they work imperfectly. If to these laryngeal and pulmonary symptoms are added the fatigues of trench life, and if the man has lost flesh, he will almost inevitably be taken to be suffering from tuberculosis. But the absence of bacilli from the sputum, and the condition of the larynx, should put the observer on the right path.

References.—[1]*Rev. de Chir.* 1916, xxxv, ii Sem., 1; [2]*Jour Amer. Med. Assoc.* 1917, ii, 619; [3]*Ugeskr. f. Laeger*, 1915, Sept. 23; [4]*Boston Med. and Surg. Jour.* 1917, ii, 110; [5]*Brit. Med. Jour.* 1916, ii, 839; [6]*Rev. de Laryngol. etc.* 1916, Oct. 31.

LEISHMANIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

L. Rogers[1] records a three years' investigation of cases of chronic splenomegaly in Calcutta with a view to establishing clinical rules for differentiation of kala-azar from chronic malarial and other causes of enlarged spleen, in order to enable medical men without laboratory facilities to be able to recognize kala-azar as early as possible, when the specific antimony treatment is practically certain to be effectual. Out of 166 consecutive cases examined by spleen puncture, in 66 the Leishman-Donovan bodies were found, 100 being negative. Of the former, all but one had prolonged fever never yielding to quinine within two weeks. On the other hand, in the negative cases 51 per cent had no fever, while in 31 per cent more the fever ceased within a week, usually under quinine. He concluded that the size of the spleen and degree of anæmia are of no diagnostic importance, but great leucopenia, such as less than 1000 to 1500 white corpuscles, especially if fever has persisted for less than one year, is practically diagnostic of kala-azar, while a history of fever on and off for three years and over, with chronic splenomegaly, is almost diagnostic of chronic malaria as against kala-azar. The temperature curve, however, affords the greatest diagnostic aid in chronic splenomegaly in Lower Bengal. If fever is absent, or ceases within seven days, with or without full doses of quinine, active kala-azar can practically be excluded, while if fever persists beyond a week in spite of 20 to 30 gr. of quinine a day, the case is so extremely likely to be kala-azar that the patient should be treated as such with tartar emetic intravenously. He has not succeeded in differentiating any further febrile forms of splenomegaly from kala-azar and chronic malaria, but it is still possible that such may be found.

J. W. Cornwall and T. K. Menon,[2] in further studies of kala-azar, believe that the action of bacteria in preventing the growth in culture tubes of the flagellate stage of the Leishman-Donovan body is due to their exhausting the pabulum. They have found the flagellate stage of the kala-azar parasite in the intestine and hind gut of bed-bugs, but

could not obtain regurgitation of the organism from their stomachs. They have obtained an eighth consecutive culture of the organism from the peripheral blood of a patient who was free from fever at the time. A monkey inoculated with *L. tropica* only developed local lesions. Both forms of the parasite grow well in medium prepared from monkeys' blood.

E. Muir[3] contributes further hints on the **Antimony Tartrate** treatment of kala-azar. He had treated 143 cases in the previous twelve months, 97 of whom were discharged as cured after fever had been absent for at least two months, the spleen reduced, and the patient become stout and healthy. Of these, 81 were below twelve years of age, and 26 more from thirteen to sixteen, and only 36 seventeen years and upwards; so the disease is much commoner in children than in adults. In all these and hundreds of others spleen puncture had been performed, with only one fatality, due to neglect of proper precautions. In young children he gives chloroform to prevent struggling. A drop of pure carbolic sterilizes and anæsthetizes the skin. The skin is first punctured, and then the needle is thrust quickly into the organ during quiet breathing, and firm manual pressure applied for half an hour. Including 29 cases of probable cure, 81 per cent recovered, and of cases ill less than six months before treatment all recovered. In advanced cases chills should be avoided, and the diet restricted unmercifully to avoid intestinal derangements. Emetine is useless in the dysentery of kala-azar. **Castor-oil Emulsion** and **Pulv. Cret. Aromat. c. Opio** are best in children. **Digitalis** is good for low blood-pressure under antimony tartrate treatment. The doses should be increased very slowly in bad cases. He thinks that now the antimony treatment is established the Government should take steps to stamp out the disease.

H. N. Brahmachari[4] found kala-azar parasites in only 27·1 per cent of enlarged spleen cases in Calcutta, while 21·1 per cent showed malarial parasites, and 51·8 per cent neither. He records six cases, each treated with a different drug, with variable results.

L. Rogers[5] records further cases of kala-azar, including 6 young children, treated with **Tartar Emetic** intravenously. In 35 consecutive cases in Europeans, 28 were cured, 3 apparently cured but still under treatment, 3 improved but left hospital prematurely, and 1 died of phthisis. He records other successful cases in Indians, but gives two cases of fatal terminations apparently due to the toxic effect of the large doses of the drug, and does not now advise increasing the doses of the 2 per cent solution he uses much beyond 5 c.c. in Indian patients. He advises the doses to be regulated by the body weight, the maximum dose to be 1 c.c. of the 2 per cent solution for every 10 lb. of body weight (equal to 2 cgrms. of the drug), with a maximum of 10 c.c. in Europeans in good general condition and 7 c.c. in Indian patients. This maximum dose should only be reached very gradually, and to commence with in children and debilitated subjects only one-third of this dose should be given, and in patients in good general

condition not more than one-half of it. This rule was worked out from a study of over 1000 injections in hospital.

Cutaneous Leishmaniasis.—L. Bodley Scott[6] records his experience of 250 cases of this disease on the North-West Frontier of India, where it is very common. The parasites are not always easy to find, being often situated deep in the tissues, while in late cases they may have died out. He does not think that bed-bugs transmit the disease. The sores are more frequently multiple than not, coming out in one crop or within a few weeks, and cause very little pain. The only forms of treatment he has seen effectual are **Excision,** freezing with **Carbon-dioxide Snow,** and intravenous injections of **Tartar Emetic**. Carbon dioxide is excellent if the sores are few and not very large. Tartar emetic has undoubtedly proved to be the best and most convenient treatment, as first shown in dermal leishmaniasis by Machado and Vianna in South America in 1913. In 8 cases in which he failed to find the parasites, all were cured within from twelve days to three weeks with from four to six injections, and he has now treated 63 cases. He gives injections two or three times a week of a $1\frac{1}{2}$ per cent solution in doses of 0·04 to 0·15 grm., or less if toxic symptoms occur. On the average seven injections in twenty-seven days sufficed. In non-ulcerative cases 16·5 days was the average time for cure. J. A. Sinton[7] also reports on tartar emetic injections in cutaneous leishmaniasis in six cases, with cure in from twelve to fifty-three days with from three to nine injections.

References.—[1]*Ind. Med. Gaz.* 1917, Jan., 7 ; [2]*Ind. Jour. Med. Research*, 1917, April, 688 ; [3]*Ind. Med. Gaz.* 1917, Sept., 317 ; [4]*Ibid.* 265 ; [5]*Ibid.* 239 ; [6]*Ibid.* 231.

LEPROSY. *Sir Leonard Rogers, M.D., F.R.C.P.*

Ralph Hopkins[1] discusses the early manifestations of leprosy, and lays special stress on persistent numbness of the hands and feet, and especially of the left little finger, or a long-standing macular eruption without scaling. Epicritic sensation is lost before protopathic, except that loss of sensation to pain may be present early. Nodules first appear on the head and dorsum of the hands. The bacilli can often first be found in the nasal secretions.

J. A. Honeij[2] records some clinical observations. He agrees with others in thinking the incubation period to be about eight years. Inflammation and even ulceration of the hard palate near the uvula is an early sign. Inflammation and ulceration of the intestines, with diarrhœa and the recovery of the bacillus from the stools, have been verified post mortem. The blood shows little change, but albumin is usually present in the urine. Bone changes were found with *x* rays in all cases. The average duration of life after admission to the home was ten years and three months, but most cases had been diseased some years before admission. A. J. Kohiyar is recorded by A. Powell[3] to have noted enlargement of the nipple in leprosy, and in 237 cases examined by them it was present in 79 per cent affecting both nipples and in 3 per cent one nipple.

C. L. Palk and R. Bryson[4] have made *x*-ray examinations in leprosy to determine if the bone changes are of early diagnostic value, but concluded that the disease cannot in any form be diagnosed with certainty in its early stages by examination of the bones of the extremities. They also examined nasal smears in 63 cases, with positive results in 77 per cent. R. Stanziale[5] gives an account of his bacteriological researches, in which he infected rabbits by implanting leprotic material into the anterior chamber of the eye. He also obtained a culture of an acid-fast bacillus from one such case.

H. C. Brill[6] records chemical analyses of the **Oil of Hydnocarpus Venenata Gaertner,** or false chaulmoogra oil, and he shows it to have a closely similar composition to those of two other species of hydnocarpus, and also to true **Chaulmoogra Oil** derived from the seeds of *Taraktogenus kurzii*. All four contain both chaulmoogric and hydnocarpic acid, and cannot be distinguished from each other by chemical analysis, while they all differ materially from the oil derived from *Gynocardia odorata*, which does not contain those acids.

S. Ghosh[7] reports on a chemical investigation of chaulmoogra oil made in connection with L. Rogers's researches on the treatment of the disease with injections of the soluble sodium salts of the fatty acids. The buttery substance obtained by pressure under steam heat yielded a larger quantity of the higher melting-point acids than the cold-drawn oil which is used in the treatment of leprosy. This observation is of interest in connection with a further paper by L. Rogers,[8] in which he states he has recently obtained better results from the use of the salts of the higher melting-point acids than with those of the lower ones he reported on in 1916. Of 12 cases treated for upwards of a year, in 8 the lesions are reported to have disappeared. The intravenous method gave the best results, especially in cases showing inflammatory reactions in the diseased tissues, with breaking down of the bacilli.

N. Bercovitz[9] records a preliminary report on fourteen cases treated in China with **Chaulmoogra Oil** hypodermically. The average duration of the disease was eleven years and the earliest four years. Heiser's formula was used, and injections were given weekly for nine months in doses increased from 1 to 3 c.c. **Sodium Bicarbonate Baths** were also given three times a week. General improvement in health soon appeared, followed in anæsthetic cases after six or seven months by pains in the legs and slight return of tactile sensation, while in one, multiple ulcers on both hands healed soundly. Tubercular and mixed cases also showed marked improvement, with more or less absorption of the tubercles, beginning after from six weeks to eight months. Deposits of fibrous tissue were found in some of the nodules, but acid-fast bacilli were still present.

REFERENCES.—[1]*New Orleans Med. and Surg. Jour.* 1917, July 5, 56 ; [2]*Ibid.* ; [3]*Brit. Med. Jour.* 1917, i, 649 ; [4]*Ind. Med. Gaz.* 1916, Sept., 316 ; [5]*Ann. Trop. Med. and Par.* 1916, Sept., 165 ; [6]*Philadel. Jour. Med. Sci.* ix, No. 2, 75 ; [7]*Ind. Jour. Med. Sci.* 1917, April, 691 ; [8]*Ind Med. Gaz.* 1917, Nov. ; [9]*Jour. Amer. Med. Assoc.* i, 316.

LETHARGY. *Herbert French, M.D., F.R.C.P.*

Verger[1] reports two cases of lethargy in males. This rare condition was rendered the more singular in that they presented themselves at the same time, and were studied in beds placed side by side. The cases showed notable dissimilarities.

Case 1.—This was a lyric artist who had been in perfect health up to the time of mobilization, and was without neurotic taint. He took part in the battle of Marne and was reported missing. Four days later he was found in a Bretagne hospital with the diagnosis of traumatic aphasia. He was evidently at that time in the condition in which he was found twenty-one months later, after he had re-entered the service. He was in a state of apparently physiological sleep, but did not waken when placed on his feet and made to walk. He was under observation for a month, and at no time did he rouse himself, nor was it possible to rouse him. From time to time he snored. The eyelids and mouth were held closed, and the colour of the face was normal. Respiration was of the abdominal type, regular and somewhat rapid (20 to 24 per minute). The pulse was likewise regular and rapid (96 to 110). The temperature varied from 36·5 to 37·1° C. The entire body was in a state of resolution, but without loss of tone. Patient made the ordinary movements of sleepers, both spontaneous and induced. He maintained the dorsal decubitus, and when placed on his side quickly resumed it. He could not be made to wear a urinal. Defensive movements were made when he was pinched, etc. To light and sound he seemed quite insensitive. All the reflexes, tendinous or cutaneous, were normal. The pupillary reflexes could not be tested, owing to convulsive movements of the eyeballs when the eyelids were opened. All the organic functions were normally performed. The sleeper was readily nourished through the invalid cup, receiving only liquids. He urinated about every three hours, and the bowels moved daily, as a result of seating him in the sick chair at intervals. He never had erections or emissions. He retained his plumpness and muscular relief to a remarkable degree. He eliminated 20 grms. urea daily. He was sent home unrelieved, and probably is still sleeping.

Case 2 was quite unlike the first. A man of 28, of unknown antecedents, infantry soldier, had typhoid fever at the Dardanelles in August, 1915. After convalescence, he began to grow progressively weak, and was interned in a hospital in a state of deep prostration. The teeth were clenched and eyes closed. He was sent to a neurological hospital, Feb. 9, 1916. On admission, he appeared like any man asleep. He was perfectly relaxed, and showed a slight tendency to hold any artificial attitude. Unlike the other patient, he made no sleep movements, spontaneous or induced. His respiration was regular, slow, and shallow (10 to 12), save on occasions when it suggested the Cheyne-Stokes type. The pulse was from 75 to 90, temperature from 36·4° to 37·5° C. The tendon reflexes, at first feeble, disappeared outright. The patient was difficult to feed because of his clenched jaws. The tube was passed either behind the last molar or through the nose. After a food article had been taken for a certain number of days, intolerance developed toward it, and thereafter it was rejected. He wore a urinal and passed from 900 to 1000 c.c. urine daily. Bowels moved only after enemas. Stools were copious, and often contained undigested food. He remained in this state until Sept. 1, 1916, having wasted to a skeleton. A vasomotor reaction could be obtained in the face when he was handled, but his appearance in general was cadaveric. When apparently near death he awakened, and asked for rum; said he was cold, and had pain in the buttocks. He went slowly into a state of collapse, could not respond to stimulants, and died Sept. 2.

The author regards the first case as a typical example of hysterical lethargy, while the second was an extreme stupor like that of a hibernating animal, in which the functions of the brain were suppressed.

When the patient finally wakened the act was preceded by a marked diarrhœa, which may be regarded as critical—a discharge of some toxic product which had benumbed the cortical cells. Autopsy showed only typical inanition.

Reference.—[1]*Gaz. Hebd. des Sci. Méd. de Bordeaux* (abst. *Med. Rec.* 1917, i, 961).

LEUCOCYTHÆMIA CUTIS. *E. Graham Little, M.D., F.R.C.P.*

Batty Shaw and Loughlin[1] report a case of this rare disease. The patient was a farm labourer, age 37, who had served as a soldier in India, Burma, and Aden. The disease started with pains in the joints and back, followed in a few days by the development of purple patches on the body. Ulceration and a nodular eruption came on later. His temperature was raised to 101° and 102°, pulse-rate was increased, and he was obviously very ill. There were numerous tumours, involving the skin of the forehead and face; they were present also in the neck, the front of the body, the arms and forearms, and the fronts of the thighs and legs: in some parts of the body they were absent, e.g., the ears and the eyelids, the elbows, knees, hands, and feet. Some were purple, others red or pale pink. They were painless, were not deeply attached, involving the skin, and being movable; they were soft and free from ulceration. There was a shallow ulceration of the skin over the sacrum, and penile ulceration. The skin of the ears, eyelids, and mucous membrane was distinctly pale, but the skin of the body generally had brownish pigmentation, and the legs especially showed patches of purpura. The nodules at the beginning were described as being much flatter than they were later. There were subconjunctival hæmorrhages in both eyes; only a few deposits were found on the back; the feet were œdematous: the skin was rather hyperæsthetic, but there was no pruritus. The voice was distinctly hoarse. The mouth was pale, but the tonsils were enlarged and showed purplish patches of discoloration. The only glands that felt at all enlarged were those of the groin; their enlargement appeared to be due to the ulceration above-mentioned. Neither spleen nor liver could be felt. The patient's memory was found to be impaired, but no physical signs of disease of the nervous system could be made out. Some tumours of the same type were found in the pharynx and larynx, and there were hæmorrhages in the fundi oculorum. The blood-count was taken on five occasions, and the results are given in the table on opposite page. The red cells showed vacuolation and poikilocytosis. On only two occasions were nucleated red cells seen. Microcytes were always present; macrocytes on only two occasions.

The histological character of sections from one of the nodules is thus described:—

"*Stratum reticulare:* The superficial zone is densely infiltrated with cells, in the main resembling lymphocytes. Many of the cells are, however, rather larger than normal lymphocytes; the nuclei are

less uniform in size, and many are slightly oval. A specially wide and dense tract of infiltration follows the course of a hair follicle, and elsewhere similar infiltration is present, though much smaller in amount. In certain areas the lymphatic clefts of the stratum reticulare are markedly dilated, and the intervening connective tissue is increased in amount and density. In other areas the endothelium of the clefts is hyperplasic; in places the cells are swollen, highly protoplasmic, cubical, and arranged around a central lumen; in other places they are flattened, fusiform, polyhedral, arranged in narrow, solid columns or masses. Scattered through the reticulare are small areas of red cells.

Total number of white cells per cubic millimetre	Percentage of lymphocytes		Percentage of polymorpho-nuclear cells	Date
	Small	Large		
6000 ..	73	2	25	Aug. 25, 1916
3000 ..	60	10	30	Sept. 1, 1916
3500 ..	50	6	44	,, 12 ,,
3400 ..	60	8	32	,, 30 ,,
6200 ..	38	6	56	Oct 4, 1916
4420 ..	56·2	6·4	37·4	Average

"*Stratum papillare:* The papillæ are swollen from œdema. The cell infiltrate of the reticulare encroaches very slightly on this layer, except in certain of the papillæ, where a central column of cells extends almost to the epidermis, which forms a thin stratum with short and narrow interpapillary processes; presenting then the general picture of lymphocytosis with chronic articular lymphangitis."

Treatment adopted was the administration of arsenic by the mouth, under which the hæmoglobin index was raised, but without corresponding clinical improvement. Galyl injection was also tried without success. The patient had a convulsive fit, became comatose for three hours, and died.

The full *post-mortem record*, which is very interesting, is appended: Body wasted; most parts show firm deposits in the skin, some of which are hæmorrhagic, and the whole body shows brown pigmentation; feet œdematous. Brain: Excess of cerebrospinal fluid; soft membranes œdematous; brain pale. Heart: Small, fat on the surface, atrophic and œdematous; a fibrous patch on anterior surface of right ventricle; heart muscle rather brown in colour; considerable hydropericardium; aorta normal. Lungs: One or two small nodules present in each aryteno-epiglottidean fold; large deposit occupying the whole border of false vocal cord, which is ulcerated and sloughing at its posterior end. A large deposit in the hinder wall of the larynx, and a small deposit in the upper part of the trachea (which is congested throughout). Tongue: There are several large deposits on the back of the tongue; tonsils not enlarged.

Glands: One or two glands in lower part of the neck and mediastinum show trifling enlargement and are rather hard; mesenteric and other glands normal. Stomach, intestines, and pancreas normal. Spleen: Universally adherent; enlarged; tougher than normal; weight 13½ oz. Liver appears normal. Peritoneum: Considerable ascites. Kidneys: One of the kidneys has several areas in which multiple abscesses are present, appearing as yellow spots of fluid on the surface and streaks in the cortex; otherwise the kidneys show little that is abnormal, beyond great œdema of fat of the hilum. Suprarenals: Most of the yellow fat has disappeared. Bone-marrow (from centre of femur) appears rather gelatinous, but is still yellow (the gelatinous appearance probably due to atrophy of the fat); in places the marrow is redder than normal.

REFERENCE.—[1]*Proc. Roy. Soc. Med.* (*Derm. Sect.*), 1916, Nov., 1.

LEUKÆMIA. *Herbert French, M.D., F.R.C.P.*

No treatment cures leukæmia. Benzol, arsenic, and *x* rays all alleviate the malady in certain cases; and so does **Radium.** The latter may not only reduce the size of the spleen and bring the white corpuscles down to normal limits, but it may also, for the time, produce a sense of well-being in the patient analogous to the improved health that patients with pernicious anæmia experience during their transient remissions. As in pernicious anæmia, however, relapse is certain; yet it is something that radium can effect as much as it sometimes does. Moreover, those remissions of symptoms may be produced in leukæmia by radium in cases in which *x*-ray treatment and benzol have failed to bring about any further improvement at all, temporary or otherwise. T. Ordway[1] records a series of cases in point, and although he emphasizes the fact that the remission is but temporary, he urges that it is well worth while attaining it even if it be but for the time. *Plate XXXIV* illustrates the great diminution in the size of the spleen that local applications of radium may effect. The relief to the dragging weight in the abdomen alone is very great. When radium is used for the treatment, screens or filters of lead 2 to 3 mm. in thickness, of brass 1·2 mm., or other heavy metals, such as silver, gold, or platinum, allow the penetrating hard beta and gamma rays to pass and intercept the alpha and soft beta rays, which would otherwise be absorbed and cause destructive changes in the superficial tissues. As the amount of the more penetrating rays is only a small proportion of the total activity—less than 5 per cent—it is necessary in deep therapy to make exposures correspondingly long.

The principles of cross-fire as well as deep therapy are made use of in the treatment of leukæmia by surface applications of radium. The area of the enlarged spleen is carefully and plainly marked out with skin pencil or grease paint (red or black), the outline being obtained by percussion and palpation. The various landmarks, such as the costal margin, anterior superior spine and crest of the ilia, the symphysis pubis, and the umbilicus, are marked. A series of small squares

PLATE XXXIV.

RADIUM TREATMENT OF LEUKÆMIA

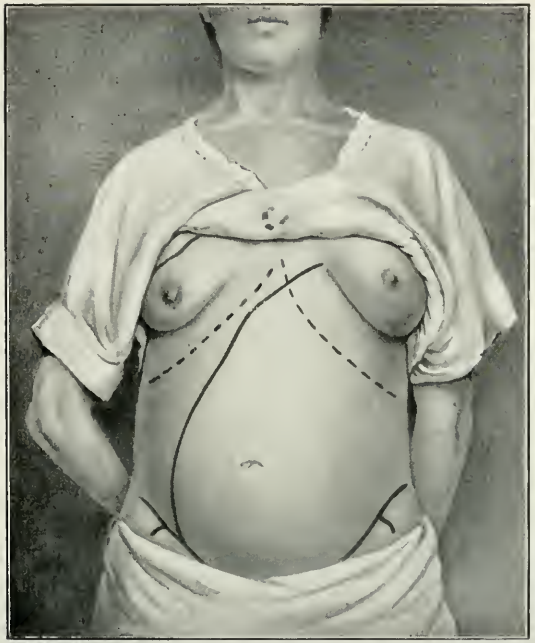


Fig. A.—Photograph of patient, Nov. 5, 1915, showing the outline of the enormously enlarged spleen and the prominence of the bony framework. The costal margins, crests and anterior superior spines of the ilia are also outlined.

Fig. B.—Photograph of the patient, Jan. 31, 1916, showing the improved nutrition of trunk, and the marked reduction in the size of the spleen.

Redrawn from the 'Boston Medical and Surgical Journal'

3 cm. in diameter, when the radium applicator is 2 cm. in diameter. are marked over the area of the enlarged spleen. It is important not to have the successive application areas too near together, or the skin between them will be 'burned' by the double dose. The squares thus marked out are numbered serially. A swathe of thin cotton cloth is carefully fitted to the abdomen, and the outline of the spleen, bony landmarks, and small squares is traced upon it. This swathe must be smoothly and accurately fitted and kept in accurate position by means of the landmarks above mentioned, for it is left in place during each single series of treatments. The purpose of the swathe is to avoid the irritation of repeatedly applying and removing the adhesive plaster which holds the radium applicator in place, for it has been found that the area which is being or has been radiated is particularly sensitive to injury from the repeated application and removing of adhesive plaster. Indeed, such added irritation may induce vesiculation or even superficial ulceration of the skin. Tracings of the areas and landmarks marked on the swathe, are now made on tracing cloth, which serves as a chart for guidance.

Duration of Application and Amount of Radium Used.—When from 50 to 60 mgrms. of radium element or millicuries of radium emanation are employed, evenly distributed over a surface applicator, 2 by 2 cm. in diameter, and the filtration and protection above-mentioned is used, the radium may be left in each position from four to six hours—four hours if there are 60 mgrms., six hours if there are 50 mgrms. and if the filtration is 3 mm. of lead. With this amount of radium and the above technique, it is possible for complete remission in leukæmia to occur with three series of treatments. Amounts of radium, however, as small as 25 mgrms., even when this is in the form of a tube, have reduced the spleen to normal size, and have caused the characteristic improvement in the blood and in the general condition of the patient, but the time required is longer, and the series of applications more numerous.

A series of blood-counts showed the way in which the leucocytes diminished progressively in the case illustrated above.

J. T. King[2] draws renewed attention to the fact that the diagnosis of leukæmia may be missed if too much dependence is made upon the total leucocyte count. Leukæmia may occur without any increase in the total leucocyte count at certain periods of the disease, and the differential count has then to be relied on rather than the total count in arriving at the diagnosis. No fewer than fourteen of a total of 105 cases of leukæmia on record at the Johns Hopkins Hospital were without leucocytosis at some time while under observation, and King uses the term 'aleucocythæmic leukæmia' to designate this phase.

REFERENCES.—[1]*Boston Med. and Surg. Jour.* 1917, i, 490; [2]*Johns Hop. Hosp. Bull.* 1917, March, 114.

LICHEN PLANUS.

Case cured by **X Rays** (p. 56).

LIP, NON-INFECTIVE GRANULOMA OF.

E. Graham Little, M.D., F.R.C.P.

Shattock[1] records a most remarkable tumour of the lower lip occurring in a healthy man as the result of an accident by which, in falling from a bicycle, the lip had been injured, and sand introduced into the abrasion. The tumour did not become noticeable by the patient until about ten years after the accident, and at this time the segmental glands near the swelling were enlarged. Glands and tumour were excised, and proved to contain silica imbedded in typical giant cells, without any caseation. The tumour is thus to be described as a non-infecting granuloma of tuberculoid kind. No micro-organisms were found, and the man gave a negative von Pirquet reaction.

Reference.—[1]*Proc. Roy. Soc. Med. (Path. Sect.)*, 1917, Jan., 6.

LIPODYSTROPHIA PROGRESSIVA. *Herbert French, M.D., F.R.C.P.*

Lipodystrophia progressiva is a rare disease or morbid peculiarity, mainly or wholly confined to the female sex, and characterized by the progressive disappearance of the subcutaneous fat from the parts above the lower extremities, that is to say, above the buttocks and inguinal folds. The fat atrophy seems to attract attention first in the face, and later on, to spread to the upper extremities and trunk. Perhaps in some cases it remains limited to the face and neck, or face, neck, and thorax, whilst the buttocks, thighs, and legs may be relatively obese.

Though called 'progressive lipodystrophia, the disease is really not progressive in all senses of the word, for the lower extremities and buttocks are never involved ; in most cases, indeed, there seems to be an abnormal accumulation of subcutaneous fat in the thighs and gluteal regions, such as occurs in many females, especially at middle age. In females the predominance of subcutaneous fat about the thighs and gluteal regions is practically a secondary sex-character. The gluteal prominence is greatly exaggerated in some African races, constituting the racial peculiarity known as ' steatopygia,' which is illustrated by the pictures of the ' Hottentot Venus.' Moreover, when the subcutaneous fat has nearly all disappeared from the affected regions, the disease comes to a standstill.

Although at the start there may have been associated neurotic or other troubles, when the disease once comes to a standstill, and sometimes during the progress of the affection, the general health appears to be in nowise affected by the lipodystrophia. The patients are ordinarily able to do as much work and stand as much fatigue as the average normal woman of the same age, and they may excel in energy and strength.

The etiology is not known : the importance lies mainly in its recognition, lest it be mistaken for something more serious.

A good account of the malady, with references to the literature upon the subject, is given by Parkes Weber.[1]

Reference.—[1]*Quart. Jour. Med.* 1917, Jan., 131.

LUMBAR PUNCTURE. (*See also* SPINE, AFFECTIONS OF.)

J. Ramsay Hunt, M.D.

Lumbar puncture has become so common a procedure in diagnosis and treatment, that it would seem to be highly desirable that some standard method be used for the determination of the intracranial pressure, so that in a given case, in addition to the usual findings, a report of the existing pressure should also be recorded. The methods usually employed for this purpose are very unreliable, e.g., the estimation of the pressure by the rapidity of flow from the lumbar-puncture needle, or the height to which the fluid may ascend in an attached tube. Under constant pressure, the rapidity of flow from a lumbar puncture is dependent on many factors, viz., the calibre of the needle, the accuracy of its introduction, the possible partial occlusion of its tip by membranes or nerves, and the position of the patient. The normal pressure has been stated by Adamkiewics to be from 80 to 100 mm. of water ; by Key and Retzius, from 160 to 200 mm. ; by Quincke, from 40 to 60 mm. ; by Koenig, from 125 to 150 mm. This would indicate a variation from 60 mm. to 200 mm. as a maximum. It is inconceivable that, under normal conditions, such latitudes of pressure are possible ; at least, they form no basis for comparison in judging abnormal conditions.

L. H. Landon[1] has devised and used a new form of needle and manometer for lumbar puncture. It is hoped this instrument, or one equally good, may be accepted as standard, and that attention will be paid to the details of its use, to the end that the estimation of intracranial pressure may be rescued from the realm of guesswork and placed on the solid ground of scientific certainty. It consists of a small mercury manometer with a corrected scale, graduated in millimetres up to 70, attached between the arms. The scale can be so adjusted that the zero mark can be placed at the mercury level. At the top of each arm is a cut-off valve to prevent loss of mercury when the manometer is not in use. The openings for attachment to the needle are ground to standard Record gauge to admit a tip on the rubber tube connecting the needle and manometer. This permits of quick and easy connection. The special needle of No. 12 wire gauge is constructed of iridoplatinum. This metal will bend or kink, but is not easily broken. The shank or outer end of the needle has a Y outlet with a two-way cut-off cock valve. This permits of opening either outlet while the other is closed, or both may be closed at the same time, so that no fluid can escape until the first reading is made. The tips of these outlets are of Record pattern. The tube leading to the manometer is attached to the straight outlet ; through the lateral outlet, the fluid, when desired, is permitted to flow from the needle. The manometer and needle, and the connecting attachment, together with a 1-c.c. Record syringe and needle for local anæsthesia, are contained in a small metal case of pocket size.

The patient should always be in the lying position, with the cerebrospinal axis as nearly as possible horizontal with the table

or bed. Any deviation from this position, even the raising or lowering of the head, will modify the reading. The patient is placed on the left side, with the spine well arched by flexing the neck and thighs. Puncture is made in the mid-line between the fourth and fifth lumbar vertebræ, after anæsthetizing the skin and subcutaneous tissues at the point of puncture by the injection of 0·5 per cent novocain solution. As soon as it is felt that the dural sac is punctured, the stylet is withdrawn, and at the appearance of the first drop of fluid, the shut-off cock is turned to the left, thus shutting both outlets until proper connections are made. The rubber tubing connecting the straight outlet and the right arm of the manometer is attached, and all valves are opened. The mercury will immediately rise in the left-hand arm, and the height is noted on the scale. The lateral outlet of the needle may now be opened, which at the same time cuts off the straight outlet and permits the fluid to escape. Withdrawal of fluid is thus at all times under full control, guided by the effect on pressure. Not only do the needle and manometer permit of perfect control over the withdrawal of fluid, but they are also of distinct advantage in the intraspinal administration of serum or other therapeutic agents. Oscillations of the mercury column occur synchronously with the pulse and respiration respectively, but are slight and of no moment. From a large number of observations Landon has found that normal intracranial pressure varies from 6 to 10 mm. of Hg, with an average nearer 8 mm. Readings even slightly above 12 mm., under proper attention to details of the technique, are regarded as suspicious.

Puncture Headache.—The methods of modern medicine have caused, not a new disease, but an additional morbid state, namely, the headache and associated symptoms following puncture of the spinal canal and removal of cerebrospinal fluid. It has become so common, and its cause is so well recognized, that the term 'puncture headache' has become a colloquialism in the hospitals. According to C. L. Dana,[2] it is not a serious condition, and it lasts but a short time; but it is a distinctly new thing in pathogenesis and neurology.

The headache rarely begins until the day following the puncture, when the patient usually is allowed to get up. It may start, however, directly after the operation, or come on three days later, depending on the activities of the patient and the conditions of the cerebrospinal-fluid circulation. The patient feels a diffuse bilateral pain, rather severe over the upper brow, and perhaps somewhat less severe in the back of the head. Occasionally it is worse in the occipital region. The pain may be accompanied with nausea and even violent vomiting, and also with some giddiness, mental confusion, and faintness. The symptoms are increased by active exercise, and usually are promptly relieved by lying down. The flatter the patient lies, the better he feels. There may be some changes in the pupils and in the blood-pressure. The condition lasts with remissions for from five or six days to two or three weeks. When the trouble lasts and is obstinate, there is an accompanying cerebral dysthesia and

PLATE XXXV.

LYMPHADENOMA WITH CUTANEOUS LESIONS

Frontal aspect. Showing enlarged cervical glands and dense infiltration of skin of pubic region, scrotum, and penis.

Plates XXXV. XXXVI. and XXXVII by kind permission of the Royal Society of Medicine.

PLATE XXXVI.

LYMPHADENOMA WITH CUTANEOUS LESIONS—*continued*

Dorsal aspect. A scar can be seen in the upper lumbar region to the left of the mid-line.

PLATE XXXVII.

LYMPHADENOMA WITH CUTANEOUS LESIONS—*continued*

Lateral aspect. Showing scar on the side of the herpetic eruption.

sense of confusion or giddiness, which may cause worry and alarm. In diagnostic puncture the amount of fluid usually removed is from 4 to 10 c.c. It does not make much difference whether a small or large amount is removed within these limits, though some state that headache rarely occurs if it is very small and is removed very slowly. It can usually be prevented by keeping the patient in a horizontal position for three or more days. After its occurrence, the effective measure is to return the patient to bed. Possibly the very slow removal of the fluid in minimal amount (2 c.c.) may be effective. Abdominal compresses may also help.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 1540; [2]*Ibid.* 1017.

LUNG, ABSCESS OF. *Arthur Latham, M.D., F.R.C.P.*

Tewkesbury[1] reports two cases in which compression of the lung in the treatment of an acute abscess has been carried out, and concludes: (1) The mortality of acute lung abscess treated medically is high, approximately 60 per cent, and the percentage of cures low, about 10 per cent. (2) The results with rib resection and drainage are better, but we still have a mortality of about 30 per cent. Moreover, this operation often leaves a patient with a draining sinus which may persist for a year or more. (3) Artificial pneumothorax is a rational method of treatment in all cases in which there is a communication with the bronchus, and gives promise of appreciably lowering the mortality and raising the percentage of cure in acute abscess.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 770.

LYMPHADENOMA. (*See* HODGKIN'S DISEASE.)

LYMPHADENOMA WITH CUTANEOUS LESIONS.

E. Graham Little, M.D., F.R.C.P.

Corbett[1] contributes a record and excellent photographs of a very remarkable case of lymphadenoma with innumerable miliary nodules in the skin, the lymphadenomatous nature of which was demonstrated by histological examination. The blood-count showed the following characters: erythrocytes, 5,000,000 per c.mm.; hæmoglobin, 80 per cent; colour index, 0·8; leucocytes, 30,640 per cmm.; (polymorphonuclears, 19 per cent; small lymphoctyes, 35·75 per cent; large lymphocytes, 8·5 per cent; large hyalines, 2·5 per cent; eosinophiles, 34 per cent; basophiles, 0·25 per cent). (*See Plates XXXV, XXXVI, XXXVII.*)

REFERENCE.—[1]*Proc. Roy. Soc. Med.* 1917, Jan., 64.

LYMPHATISM. (*See* STATUS LYMPHATICUS.)

MALARIA. *Sir Leonard Rogers, M.D., F.R.C.P.*

ETIOLOGY.—R. Row[1] describes a modification of Bass's method of cultivating the malarial parasite which he thinks is simpler. He uses glucose serum infected with the plasmodium-containing blood to give a thin uniform deposit of corpuscles on the flat bottom of a special

culture tube. L. S. Dudgeon and C. Clarke[2] deal with 51 cases, and find that cases clinically malaria with negative blood-films have been confirmed by cultural methods. Of 19 cases of malignant tertian malaria, only 4 gave completely negative results, while in 17 cases of benign tertian the parasite failed to grow under the same conditions. H. A. Taylor[3] has made a comparative study of thick and thin blood-smears for diagnosis of malarial fevers. In 526 thick films the parasite was found within five minutes, while in thin films from the same patient they were found only 125 times within half an hour, giving a very great advantage to the thick-film method.

J. W. S. Macfie and A. Ingram[4] record their studies of malaria on the Gold Coast. The great majority of the infections were of the subtertian variety, benign tertians and quartans being comparatively rare. The majority of the cases occur from July to September after the June rains. They discuss abnormal forms of malarial parasites, and found forms similar to those which Stephens has described as a new parasite, but they are unable to confirm his opinion, and agree with others in regarding them as malignant tertian parasites. They describe cases of œdema with albuminuria in chronic malaria in which the symptoms all yielded to quinine.

Treatment.—A. J. Oehsner[5] deals with the treatment of malaria in communities such as the population on a plantation. He holds that **Quinine** will not kill the plasmodium in the spore stage, but it will prevent spores developing into adult forms. He advocates 2-gr. doses every two hours for sixty hours day and night, followed by no quinine for five and a half days, and then the repetition of the former dosage. Richet and W. B. Griffin[6] have treated bad malarial cases, including comatose ones, with 0·40 c.c. **Chlorhydrate of Quinine,** 0·20 c.c. **Urethane,** in 1 c.c. distilled water diluted with 13 c.c. saline, intravenously, with very favourable results. G. Arello, F. G. Miranda, and F. Robleto,[7] working in Nicaragua, have used soluble quinine salts intravenously as a routine measure in the bad malaria of that country, with very good results. J. W. W. Stephens and four others[8] have given 15 gr. of **Quinine Bihydrochloride** in 2 c.c. water on two consecutive days, and found the paroxysms, and the parasites in the peripheral blood, always disappeared within two days, but 19 out of the 20 cases relapsed in from ten to eighteen days. All the cases were benign tertian ones.

J. W. W. Stephens, Yorke, Blacklock, Macfie, and Cooper record further work on quinine in malaria.[9, 10, 11, 20]. Intravenous injections of quinine bihydrochloride, one to six doses of 10 to 15 gr., caused rapid disappearance of benign tertian parasites, but were usually followed by relapses within two to three weeks, while in the case of malignant tertian parasites they did not completely disappear under the treatment. Intramuscular injections of amylopsin and trypsin completely failed to control benign tertian malaria. They also tried intramuscular injections of quinine alkaloid in benign tertian malaria, but they failed to prevent relapses occurring within two to four weeks in the majority of the cases.

L. Rogers[12] records experiments to ascertain the suitability of various quinine and cinchonine salts for intravenous injection, by testing their action on blood serum and their toxicity for pigeons and rabbits. He found the **Acid Hydrobromide** to be the least toxic, while the commonly used bihydrochloride was also good. Cinchonine bihydrochloride, and an acid hydrobromide of cinchonine which was made for him, were also suitable for intravenous use (the last salt has since been successfully used intravenously in a benign tertian case). He records a pernicious cerebral and choleraic malignant tertian malaria with 46 parasites to every 100 red corpuscles which was successfully treated with 10- to 15-gr. doses of quinine acid hydrobromide intravenously.

McLean[13] also advocates intravenous injection of **Concentrated Solutions of Quinine** in malaria as well as in *blackwater fever*, these being much more efficient than dilute solutions, and practically free from danger. It has great advantages over the intramuscular method. In this way the disease can be cut short, and the patient saved much subsequent suffering, and military services much loss.

A. Gautier[14] combines quinine with hypodermic injections of ·08 to ·1 grm. of **Sodium Dimethylarsenate,** two or three doses of which, he claims, will stop an inveterate malaria. J. C. McWalter[15] advocates **Sugar** in the treatment of malarial heart.

D. Thomson[16] discusses fully diagnosis and treatment, and he advocates 30 to 40 gr. or more of **Quinine** daily for at least three weeks, followed by 10 to 15 gr. a day for a further two months in order to try to eradicate the infection completely as soon as possible. He doubts the value of small doses, such as 5 gr., prophylactically, but advises 15 to 30 gr. to be taken for short periods during actual exposure to the infection. Small doses of **Liquor Arsenicalis**, from 2 min. increased to 5 min., should be given in addition to quinine for malarial fever. In cases with an idiosyncrasy to the drug, **Methylene Blue** and **Arsenic** are reliable substitutes, although inferior to quinine.

Troubles sometimes following injections of **Quinine** (p. 24).

L. Rogers[17] has recorded three cases in which crescents, and one in which the gamete stage of the benign tertian parasites, disappeared after intravenous injections of **Tartar Emetic,** although the drug had much less effect than quinine on the intracorpuscular stage of the parasites. He suggests further investigation of the subject. Low and Newham[18] obtained no effect in crescents in one case, while Brodrib[19] found crescents to disappear after the use of the drug in one case. J. W. W. Stephens and four co-workers[20] obtained no effect with the drug on any stage of the parasites in 11 cases of benign tertian, 10 malignant tertian, and 1 mixed infection, and criticizes Rogers's statement that crescents may remain for long in the blood unaffected by quinine. E. D. W. Greig[21, 22] also obtained negative results. On the other hand, A. J. Orenstein and W. Watkins-Pitchford[23] obtained negative results in benign tertian infections, but record twenty-four consecutive cases in which crescents, which had resisted full doses of

quinine for periods varying from twelve to forty-nine days, invariably disappeared after from one to four doses of tartar emetic intravenously.

F. C. Neff[21] records 5 cases of chronic malaria in children treated with **Diarsenol** intravenously, with promising results.

REFERENCES —[1]*Ind. Jour. Med. Research*, 1917, Jan., 388 ; [2]*Lancet*, 1917, i, 530 ; [3]*Jour. Amer. Med. Assoc.* 1917, i, 771 ; [4]*Ann. Trop. Med. and Par.* 1917, June 30, 1 ; [5]*Jour. Amer. Med. Assoc.* 1917. i, 823 ; [6]*Brit. Med. Jour.* 1917, i, 190 ; [7]*Lancet*, 1917, i. 345 ; [8]*Ann. Trop. Med. and Par.* 1917, June 30, 113 ; [9]*Ann. Trop. Med. and Par.* 1917, Aug. 23, 149, 165, and 175 ; [10]*Ibid.* ; [11]*Ibid.* ; [12]*Brit. Med. Jour.* 1917, ii, 381 ; [13]*U.S. Naval Med. Bull.* 1917, and *Ther. Gaz.* 1917, Aug., 545 ; [14]*N. Y. Med. Jour.* 1917, i, 1216 ; [15]*Med. Press and Circ.* 1917, Aug. 15, 119 ; [16]*Jour. R.A.M.C.* 1917, June, 658, and July, 1 ; [17]*Brit. Med. Jour.* 1917, i, 6 ; [18]*Ibid.* 295 ; [19]*Ind. Med. Gaz.* 1917, June, 218 ; [20]*Ann. Trop. Med. and Par.* 1917, June 30, 91 ; [21]*Ind. Jour. Med. Research*, 1917, April, 766 ; [22]*Ibid.* July, 235 ; [23]*S. African Med. Jour.* 1917, April, 135 ; [24]*Jour. Amer. Med. Assoc.* 1916, ii, 1059.

MALINGERING.

A. Bassett Jones, M.B.
Llewellyn J. Llewellyn, M.B.

With the growth of knowledge, the wiles of the malingerer become more subtle, more difficult of detection. Unhappily, too, recent legislative innovations—with the increased facilities they afford for fraud—enlarge the responsibilities of the medical man in this respect. Lastly, in the matter of pensions, it is to the medical man also that the State turns for protection from this form of imposition. Hence, the detection of malingering is a matter of national import, and as such demands the increased attention of all thoughtful physicians. The limits of this article will only allow the indication of the guiding principles whereby the diagnosis of malingering may be achieved.

The physician must not belittle the problem ; the detection of simulation is the *ne plus ultra* of differential diagnosis. In short, he must be familiar, not only with the natural physiognomy of disease, but with its aberrant forms. Else how can he with reason aspire to the detection of simulated or feigned disease? Moreover, malingering and true disease may co-exist, and through lack of knowledge or too cursory examination the associated morbid condition may be overlooked.

The first step should be a searching clinical examination along authorized lines to establish the presence or absence of organic disease. During this procedure we should have a keen eye for the clinical vagaries of the malingerer, who is never better observed than when he thinks himself unobserved. Direct observation is good, but indirect better, for the subject is off his guard. The pitfalls of the deceiver are exaggeration and ignorance, and while the physician notes the former, he may take advantage of the latter. Pain is the malingerer's commonest plaint ; it is always intense, vague, and incapable of localization. In his ignorance, too, he often affects symptoms alien to the disease he seeks to imitate. Again, he usually forgets that genuine disease, if long continued, leaves its mark on general nutrition, while local disorders, also, rarely lack objective

evidences. Alleging severe disease of an internal organ, his rude health gives him the lie, even as the plump muscles of his alleged 'stiff joint' tell their own tale. Presupposing organic disease to be excluded, we are still not justified in assuming simulation ; for the symptoms may be of psychogenic or hysterical origin. If not, and malingering seems probable, we may resort to tests for simulation.

While inhuman methods of detection are not permissible, the circumvention of the malingerer by strategic ruses is justifiable. This may be achieved by suggestion, the 'method of surprise,' or the judicious use of irony, ridicule, or satire. If these fail, we may invoke tests to mislead the malingerer, distract his attention, or induce in him a state of bewilderment or mental confusion, etc. We should, too, realize the value of periodic and unexpected visits, and, in the last resort, our sheet-anchor is constant observation.

Finally, we would inculcate the necessity for caution in the formation of a decision. The pitfalls are many and diverse, and no means of investigation can be despised, much less neglected. With this caveat, we shall now proceed to describe a few tests useful for the detection chiefly of feigned nerve disorders.

Simulation of Sensory Symptoms.

Spontaneous Pain.—That an individual suffers pain may or may not be true ; obviously the mere assertion cannot be accepted as evidence of bona fides. How can we appraise its reality ?

In paroxysmal pain, if intense, the *facies* is striking, and the face is bedewed with sweat. If the patient is seen at the onset of the pain, the physician may determine the presence of quickening of pulse and respiration, with pupillary dilatation—objective signs of genuineness. If seen during a remission, we may unjustly discredit the complaint of pain. In the countenance of a malingerer we see the tension of alertness, not of suffering—the outcome of his state of active attention, not unmixed with fear. If he apes a paroxysm, his grimaces and contortions will hardly deceive a skilled observer. The malingerer cannot, happily, mimic the effects on *general nutrition* produced by prolonged pain, with its associated loss of sleep and waning appetite.

Suppression of movement in a mobile region is an index of pain, e.g., abdominal rigidity in appendicitis, etc. Again, typical *defensive attitudes* are seen in joint diseases—sciatica, psoas abscess, etc. A painful joint is flexed, a painful spine held rigid. In any given case, according to the nature and site of the alleged disorder, we should ask : Are the attitude, gait, etc., altered in conformity with what we know from experience to ensue in genuine disease ? Departures from normal in this respect are suggestive of simulation.

Correlated phenomena observed at the site of alleged pain—heat, swelling, redness—are evidence of authenticity. Vasomotor disturbances—local syncope, etc.—or cutaneous affections—herpes zoster,

cicatrices, etc.—also point to genuineness. Functional derangement of an organ at the site of alleged pain speaks against simulation—e.g., lumbar pain associated with hæmaturia, hepatic pain with jaundice, pain in the side with cough, headache with disturbed vision, facial pallor or flushing with lachrymation.

Fleeting or nomadic pains may be accompanied by no appreciable objective change, but here the presence of pyrexia, unless artificially produced, will clear up doubt.

The differentiation of *hysterical* from simulated pains is difficult, but the relationship of the former to hysterogenic zones, their quick response to mental states or suggestion, and the correlation with other stigmata, are the points on which to rely.

Pain located along the course of a particular nerve-trunk is usually genuine. But the converse is not always true, viz., that the pain which does not follow a nerve-trunk or the area of its distribution, is necessarily simulated. It may follow the supply of a blood-vessel, and be due to embolism. If so, collateral phenomena—coldness, paralyses, etc.—will attest its genuineness.

If *pressure* at the site of alleged spontaneous pain evokes or aggravates it, this is evidence of authenticity. It is so found in nerve affections and in inflammatory conditions of internal organs. But pressure may relieve spontaneous pain ; an admission that this has occurred would suggest good faith, as malingerers hardly, if ever, admit amelioration—always worse, never better.

Again, it has been often noted that in pleurisy, appendicitis, etc., the *pupil may dilate* when pressure is applied to the sensitive region. Also, in genuine disease of the internal organs there is usually *hyperæsthesia* of the segmentally related cutaneous areas. The presence of such hyperæsthesia will be objective evidence of the reality of the pain : its absence suggestive of exaggeration, if not simulation.

In estimating the genuineness of alleged spontaneous pain, we lay most stress upon : (1) Changes in facial expression ; (2) Alterations in attitude ; (3) Existence of local changes ; (4) Associated functional derangements and disturbances of general nutrition : for these cannot be reproduced by the malingerer ; and if he attempts to do so, the result is usually a caricature rather than a realistic portrayal.

The points in favour of simulation are chiefly negative, viz. : (1) Lack of facial alteration ; (2) Unimpaired nutrition ; (3) Absence of local morbid changes and disturbed functions. To these may be added : (4) Absence of accessory motor, vasomotor, and secretory phenomena not dependent on the will, such as muscular tremor, pallor or flushing of the skin, secretion of tears (not due to weeping) ; (5) Absence of pupillary dilatation and of changes in pulse and respiration ; (6) Either absence of alteration in the attitude of trunk or limb, or incompatibility of the assumed pose or gait with the alleged complaint ; (7) Vagueness in localization of the pain, or non-correspondence of the same with any known nerve ; (8) Exaggeration of the intensity of the pain.

Tenderness to Pressure.—The following tests are useful in determining the genuineness of this symptom :—

Mannkopf-Rumpf's Test.—Ask the patient to indicate the sensitive region. Then proceed to examine parts remote ; while doing so, ascertain that the pulse-rate does not exceed 100 per minute, and that the respiration is not quickened. Then place the patient at rest quietly on a couch, and apply pressure—sudden and short—to the site of alleged tenderness. If with this there be an acceleration of the pulse to the extent of 25 or more beats per minute, together with a rise in the number of respirations, while pressure on insensitive areas yields no such reaction, it may be taken that the pain is genuine. On the other hand, if the rise be slight, and a similar increase manifest itself when pressure is exercised on areas not alleged to be sensitive, then the question of deceit should be considered.

Bechterew's Test.—This observer noted that pressure on a painful area was associated with dilatation of the homolateral pupil and flushing of the cheek of the same side. These manifestations are not found in the malingerer.

Simulated Hyperæsthesia. — *Electrical Test.* — The hyperæsthetic region should be wholly uncovered and its limits defined. The subject should be so placed that he cannot overlook the apparatus. The coils should admit of noiseless adjustment, or there should be some way of cutting off the current unknown to him. The faradic current is first passed through the hyperæsthetic area, and then interrupted. Should he still continue to complain of pain, it points to simulation or exaggeration.

Simulated Anæsthesia. — In alleged anæsthesia of the hand or fingers, indirect observation is most useful. Thus, the execution of specialized movements without fumbling, e.g., writing, or buttoning of the waistcoat, would point to absence of organic anæsthesia. Bid the subject close his eyes and cross his hands behind his back with palms facing outwards. Then, sitting behind him, lightly touch the fingers with a brush, telling him to close the digits that are touched. With rapid testing and alternation of contacts, the malingerer will either bend the alleged insensible digits, or begin to bend and then suddenly straighten them. This points to deceit. The immobility of genuinely anæsthetic fingers sharply contrasts with the quick flexion of the tactilely sensitive fingers.

In anæsthesia of the trunk or limbs, the following is useful. Taking a brush, the physician begins stroking the skin over a sensitive zone, carries it through over the alleged anæsthetic zone, and finishes up on a sensitive zone. Done quickly and repeatedly, the subject is asked to indicate its path. The malingerer will find no difficulty in doing so. Then, to convict him, the skin is suddenly stroked wholly within the alleged insensitive area. If able to trace the line correctly, it is clear he *can* feel.

Test.—The subject's eyes being shut, the physician pricks sharply the alleged insensitive area, and simultaneously touches with a finger

some other region about which no loss of sensation is alleged. In genuine analgesia the touch on the sensitive area will be felt, but the malingerer, overcome by the painful sensation in the alleged analgesic area, will disregard the touch on the sensitive region. It is essential that the two stimuli be applied simultaneously, otherwise each is separately felt—the doctor is deceived, and not the subject.

Simulation of Motor Symptoms.

Simulated Paralysis.—In alleged paralysis, absence of anæsthesia, contracture, altered reflexes, muscular atrophy, electrical changes, is suggestive of fraud.

Indirect observation is of supreme value. Movements incompatible with the existence of paralysis may be performed unwittingly. The malingerer may button his waistcoat with the paralyzed hand, or, dropping some article of value, reach out to recover it. Sometimes, when he passes from the consulting room, and—unbeknown to himself—is glimpsed by the examiner, he may be seen nonchalantly rolling a cigarette with his paralyzed hand. Or, having just disclaimed all power of using his lower limbs, he may be seen to walk briskly without the aid of his crutches. Occasionally, too, the stick or crutch, although forsooth indispensable, is left behind!

Direct Tests. Variation of the Pull of Gravity.—In paralysis of the arm, the physician, bidding the subject close his eyes, raises the alleged impotent limb passively to the vertical. This attained, he relinquishes his hold, and bids the patient lower his arm slowly and gently lest he injure the limb. If he succeeds in doing this so slowly that the pull of gravity is only capable of gradually asserting its influence, simulation is proved.

Paralysis of the Deltoid.—In suspected cases of this nature, Sachs and Freund adopt the following ruse. The subject, lying prone on a table, with his paralyzed arm hanging over the side thereof, is told to raise the arm to his hip. A malingerer will probably do this promptly. Afterwards, when told to remove his arm from his hip, he will most likely affirm inability to comply, ignorant of the fact that the arm—if left to itself—would, under the influence of gravity, drop to the vertical as desired.

Distraction of Attention from the Paralyzed Part.—The subject is asked to lift and hold elevated his alleged paralyzed limb with his sound arm. Then his attention is distracted—the examiner making a show of being absorbed in the man's hand, bidding him separate his fingers, flex them, and so on. This having been designedly carried on for some time, the subject is asked to hold out his sound hand for examination—when the arm may be seen to remain for a moment poised in mid-air. This is impossible except through the agency of the alleged paralyzed muscles.

Musculospiral Paralysis.—Compensation has been claimed for feigned paralysis of this type. Evidence of simulation would lie in

the following features, which are inconsistent with the clinical picture of true radial palsy: (1) Absence of adduction of the thumb; (2) Alleged disability to extend the middle and terminal phalanges; (3) Prominence of the contour of the supinator longus muscle when the elbow—in a position midway between pronation and supination—is flexed against resistance.

Electrical Tests.—When paralysis is alleged to have followed peripheral nerve injury, and the subject denies all power of voluntary movement notwithstanding the existence of a normal response to faradism, this is proof of simulation; for the return of voluntary movement in the muscles supplied by the nerve takes place before the electrical reactions become normal.

Muscular Paresis.—Here the reciprocal innervation of antagonistic muscles provides the clue. In alleged weakness of the flexor muscles of the elbow, ask the subject to bend his elbow as strongly as possible. If, simultaneously, the triceps is felt to be firmly contracted, he is attempting to mislead us as to his degree of flexor weakness. In alleged weakness of the quadriceps extensor of the leg, we can utilize the automatic inhibition of the tone of the antagonistic muscles as follows. Strong but not overwhelming resistance is offered by the examiner to extension of the knee, which the subject is urged to carry out to the utmost of his strength. The resistance is now *suddenly* withdrawn; if the limb remain flexed, it proves that the individual has intentionally and strongly innervated the hamstrings for the purpose of invoking resistance to the effective action of the extensor muscles.

Weakness of Hand-grip.—The following procedure may be utilized to decide whether the paresis is feigned or not. The examiner bids the subject squeeze his hand: (1) With his (the subject's) wrist in full flexion; (2) With his wrist in hyperextension. If the second squeeze (with wrist in extension) is not felt to be stronger than the first (with wrist flexed), we can be sure that the man is a deceiver. He has not exerted the whole of his available force; for a normal man has more power of grip with his wrist extended than with it flexed.

Simulated Hemiplegia.—The following points would suggest fraud:—

1. Absence of signs of involvement of the facial and hypoglossal nerves on the alleged hemiplegic side—such as depression of the angle of the mouth, inflation of the cheek, effacement of the naso-labial fold.

2. Incongruence of exhibited signs and symptoms—such as absence of exaggeration of reflexes, with apparent rigidity of the leg; presence of a pes equinus, with absence of dragging of the toes along the ground; automatic correction of an existing pes equinus when standing; absence of dragging of the toes when walking, with apparent rigidity of the leg.

3. *Hoover's Test.*—The patient, lying supine, is asked to lift his sound leg off the couch. At the same time the physician notes if the

heel of the affected limb is pressed into the couch. In a malingerer this occurs. The same procedure is then carried out with the affected leg. In a malingerer there will be an apparent trial at raising the affected limb, but the heel of the sound leg will not be felt to dig into the couch. In a genuine case such would have taken place.

Simulated Contracture.—Indirect observation is often helpful. Thus, subjects feigning rigid extension of the leg, when asked to sit down, forget to keep the limb extended. Again, subjects attempting to simulate pes equinus sometimes betray themselves on standing up by the automatic correction of the deformity.

Direct Tests.—We may take advantage of the subject's ignorance to mislead him. Thus, if he allege inability to move the limbs upon the trunk, ask him to reverse the order of things and move the trunk on the limbs. For example, if he affirm that he cannot raise his leg from the bed owing to contracture of his gluteal muscles, ask him to sit up. If he does so, it shows deceit, for both in raising the limb and sitting up the gluteal muscles undergo extension.

Variation of the position of the limb may be invoked as a means of detection. If he allege flexion contracture of the wrist, the physician should place the joint in a position of extension. If now the fingers remain extended, the genuineness of the allegation may be doubted. Given true flexion contracture of the wrist, the fingers would automatically pass into flexion.

Simulated Tremor.—In all cases of tremor, note the presence or absence of associated phenomena. For the tremor may be part of a definite nerve syndrome, e.g., paralysis agitans, etc. Only in the absence of all collateral features is doubt justifiable, and then only when we have scrutinized narrowly the site and character of the tremor and its reaction to certain influences and tests.

Site and Distribution.—The following features bespeak its genuineness: (1) Tremor occurring in isolated muscles which do not as a rule act independently of their synergic allies—i.e., supinator longus, triceps, scapulo-humeral muscles, omohyoid, platysma myoides, etc.; (2) Tremors delimited to particular muscular bundles are genuine, not simulated; (3) In generalized tremor—the influence of cold being excluded—the participation of individual muscular fasciculi is proof of genuineness.

Character.—For the voluntary production of tremor, a certain degree of muscular tension is necessary, or some definite attitude must be assumed. We should look with suspicion on tremor—e.g., of the arm—if the muscles concerned are strongly contracted, or if it is only present in some particular attitude. Thus, in tremor of the hand, note whether the upper arm is held closely to the body. If so, request the subject to extend the arm at right angles to the trunk. If the tremor then ceases, it is suggestive of simulation.

Fatigue Test.—In tremor of a single limb, if its rhythm, rate, and amplitude alter in the interview, it will be suggestive of fraud. To elicit these changes, request the subject to hold the affected limb

extended. Note also if, when his attention is distracted, it continues to tremble, or ceases. Then, waiting a few minutes, note whether it has become slower, more jerky, and of wider amplitude, and if the rate of breathing or pulse is altered. If during prolonged observation the movements become gradually slower and coarser, and signs of fatigue appear, it is suggestive of simulation.

In *tremor of the fingers*, we may assume that it is genuine if, when one or two fingers are artificially fixed, the trembling continues in the others. It may be taken as genuine also, if, after fixation of the fingers, the tremor as it were passes upwards and is felt in the forearm and, if this latter be fixed, in the upper arm.

Simulated Intention Tremor.—This may not only last longer than the movement, but it may also fail to appear during the movement, if the subject deems himself unobserved. However, some forms of hysterical tremor are brought on or aggravated by active movement. In such cases, too, the tremor may outlast the movement or fail to appear during its execution. Hence, for the differentiation of hysterical and simulated intention tremor, we should have to determine the presence of other hysterical stigmata.

Seeligmuller's Test for Simulated Tremor in the Lower Limbs.—With the patient lying on his abdomen, a plate of glass oiled with vaseline is placed beneath his toes. If the tremor noticeable previous to the insertion of the plate now ceases, it is evidence of fraud, for voluntary attempts to feign a tremor can only ensue when the toes have a firm support.

Other Varieties of Simulation.

Diabetes.—This disease can be, and often has been, simulated. A man may add cane or grape sugar to his urine when voided. He may increase the volume of his urine by free consumption of fluid. Glycosuria has been produced artificially by the ingestion of phloridzin or ammonium oxalate. Malingerers have been known not only to add sugar to their voided urine, but subsequently to inject the same into their bladder. Suspicion should be aroused: (1) If the specific gravity of the urine be so high as to suggest glycosuria and yet does not reduce Fehling's solution. This suggests possible adulteration with cane sugar. Proof will be afforded if on conversion of the cane sugar into glucose a reduction of Fehling's solution ensues. (2) If, though the content of sugar be high, there is: (*a*) a total absence of acetone and oxybutyric acid; (*b*) a lack of any increase in the amount of urea and ammonia excreted. This suggests adulteration with grape sugar. To exclude the possibility that urine has been injected into the bladder after charging with cane or grape sugar, adopt the following plan: Draw the urine off by catheter, and wash out the bladder with boric acid. Detain the subject under observation for two hours, pass the catheter again, analyze the urine, and so determine the presence or absence of cane or grape sugar.

Albuminuria.—During the present war, trench nephritis has been simulated by adding egg-albumen to the urine—the associated œdema being produced by constriction of the limbs. Moreover, egg-albumen has been added to voided urine, and the same injected into the bladder by catheter. Doubts are justifiable if the content of albumin is high, and yet there is an absence of anæmia, high-tension pulse, and œdema. In such circumstances the subject should be detained under observation for two hours, and then told to pass his urine in one's presence. If the urine passed contains a high amount of albumin, there is still the possibility that egg-albumen has been added to previously voided urine and this injected into the bladder. To circumvent such deceit, draw off all the urine by catheter, wash out the bladder with boric acid, keep the subject under observation for two hours, again catheterize the bladder, and examine the urine.

Edgard Blum describes a number of devices common among malingerers in the French Army. Gastric disturbance is produced by the ingestion of a mixture of oil and tobacco ; jaundice, by smoking a mixture of antipyrin and tobacco, or by ingestion of picric acid. Dysentery is simulated by diluting fæces with urine, and adding thereto pig's fat or fragments of raw meat. Hæmoptysis is produced by pricking the back of the throat with a pin, or by sucking blood from the gums, or by swallowing animal blood ; microscopic and chemical tests will reveal the fraud. Albuminuria and œdema may be produced in predisposed subjects by taking large quantities of common salt in milk for some days. To produce an appearance of debility, vinegar in large amounts is consumed, and garlic introduced into the anus will give an anxious look to the countenance. Otorrhœa has been induced by introducing urine or irritating chemical substances into the meatus. Arsenious acid, lead, and mercury have been enlisted to cause loss of strength.

G. Sbordone states that in the Italian Army conjunctivitis is commonly simulated by introducing *ricinus* seeds into the inferior fornix.

Rivalta gives particulars of 100 cases of what he calls ' cutaneous pantomimicry.' In 43 the artificial lesions were eschars and sores, in 20 eczematoid dermatoses, in 20 suppurating and phlegmonous dermatoses, in 9 bullous dermatitis, in 8 hard traumatic œdema. In all the cases the lesions were induced by the application of a chemical irritant or, less frequently, heat or direct injury.

MASTOIDITIS. (*See* EAR.)

MEASLES.

Cinnamon advocated as a prophylactic for this condition and for German measles (p. 13).

MELÆNA NEONATORUM. (*See* HÆMORRHAGIC DISEASE OF THE NEWBORN.)

MENINGITIS IN CHILDREN. *Frederick Langmead, M.D., F.R.C.P.*

Diagnostic Value of Cerebrospinal Fluid.—Golay[1] discusses the diagnostic value of an examination of the cerebrospinal fluid as a means of distinguishing between tuberculous meningitis and the conditions which simulate it. The following is a summary of his conclusions :—

1. The *cytology* of the cerebrospinal fluid is of value only for the purpose of distinguishing between forms of acute meningitis in which polynuclear leucocytes predominate, and the affections of the meninges in which lymphocytes predominate. It does not enable us, either by the number of cells present, or by the proportions of different kinds, to distinguish between tuberculous meningitis on the one hand and conditions which simulate it, and various forms of subacute and chronic meningitis on the other.

2. The differential diagnosis between tuberculous meningitis and other affections which are accompanied by an excess of lymphocytes in the cerebrospinal fluid must be made by *chemical examination*. The proportion of albumin and the proportion of chlorides are the most characteristic features and those easiest to estimate.

3. The normal proportion of *albumin* is from 0·1 to 0·2 per 1000. It is considerably increased in tuberculous meningitis, amounting to 1 to 2 per 1000. In other forms of meningitis in which lymphocytes preponderate, it does not, as a rule, attain to 1 per 1000, whilst in conditions which simulate meningitis it is only 0·1 to 0·3 per 1000.

4. The proportion of *chlorides* is of special significance. Normally, the proportion is from 7·25 to 7·4 per 1000. This is considerably decreased in tuberculous meningitis alone, being reduced to from 5·5 to 6·5 per 1000 at the beginning, and still lower in the course of the disease. In other forms of meningitis showing a preponderance of lymphocytes, and conditions which simulate tuberculous meningitis, the proportion of chlorides is practically normal, only varying from 7 to 7·5 per 1000.

REFERENCE.—[1]*Arch. de Méd. des Enf.* 1917, April (abstr. *Edin. Med. Jour.* 1917, Aug., 127).

MENOPAUSE, DISORDERS OF. *W. E. Fothergill, M.D.*

Carey Culbertson[1] says that the menopause is a functional derangement on the part of various endocrine glands subsequent to the cessation of ovarian secretion. On this basis may be explained the psychic and somatic manifestations of the menopause. The vasomotor disturbances represent an instability of arterial tension. (1) In the majority of cases this takes the form of a vacillating hypertension, both systolic and diastolic ; (2) The diastolic pressure is not elevated proportionately to the systolic ; this produces an increased pulse-pressure ; (3) Hot flushes, sweating, and other vasomotor symptoms are directly created by the vacillations in arterial tension ; (4) In a minority there is arterial hypotension, and here also the systolic and diastolic pressures are out of proportion. Hypertension

is apparently due to a relative over-sufficiency on the part of the hypophysis or the adrenals. The psychic symptoms are apparently influenced by thyroid dysfunction ; in the majority of cases a hyperthyroidism, in the minority a hypothyroidism. The administration of the missing hormone, represented by the extract of corpora lutea from animals in early gestation, brings about a gradual restoration to normal of the blood-pressure, with disappearance of the mental symptoms. This reduction of blood-pressure by organotherapy, together with the disproportionate systolic and diastolic rise, is offered as evidence that the hypertension is a functional one and not due to organic changes.

REFERENCE.—[1]*Surg. Gyn. and Obst.* 1916, Dec., 667.

MENTAL DISEASES. (*See also* DEMENTIA PRÆCOX, GENERAL PARALYSIS OF THE INSANE, PSYCHO-ANALYSIS, SHELL SHOCK.)

Bedford Pierce, M.D., F.R.C.P.
Kate Haslam, M.D.

Mental Hospitals.—G. Elliot Smith and T. H. Pear,[1] in summing up the present state of the treatment of mental disorders in this country as revealed by the war, suggest that "for the relief of the mentally afflicted amongst us, and especially for the relief of insanity, it is our bounden duty as a nation to take measures such as most civilized countries have adopted some time ago. For this purpose it is necessary that there should be hospitals to which patients in the early stages of mental disturbance can go, without any legal formalities, and receive proper treatment from physicians competent to diagnose their troubles and to give them appropriate advice. It is important that such special hospitals should be attached to general hospitals, so that sensitive patients may not be deterred from resorting to them by the fear of the stigma which, in this country unfortunately, is so inseparably linked with the idea of a 'lunatic asylum.' It is also important that such institutions should be affiliated to medical schools, not merely to ensure the adequate education of the coming generations of medical practitioners, but also to afford the staffs of such hospitals the proper opportunities for carrying on the work of investigation which is essential for the success of the scheme we have sketched out."

Relation of Influenza and Raynaud's Disease to Mental Disorders.—Ford Robertson[2] suggests that neurasthenia, asthma, and depression are due to chronic infection with the influenza bacillus, usually in association with other organisms such as *Micrococcus catarrhalis* and the pneumococcus, and that treatment with sensitized vaccines is curative.

Hubert J. Norman[3] discusses the relationship between Raynaud's disease and cerebral disorders, epilepsy, aphasia, manic-depressive insanity, general paralysis, and hysteria. The central origin of the condition is emphasized, and various theories of causation are enumerated. The importance of the emotional factor is pointed out.

Reference is made to the changes in the peripheral circulation seen occasionally in depressed phases of manic-depressive insanity, and it is suggested that possibly the mental symptoms depend upon alterations in the cerebral circulation akin to that in Raynaud's disease. The not infrequent association between this disease and cerebral affections gives some support to the view that these, and especially mental disorders, arise from vasomotor changes in the cortex.

Classification of Mental Disease.—Barfield Adams,[4] in reviewing Bergson's theory of the dualism of instinct and the intelligence, considers that Bergson's view may assist in the classification of mental diseases. Instinct and intelligence are held to be two distinct faculties, each of which may be carried separately to the highest grade without influencing the other. Instinct has its domain in practical life, in the satisfaction of the passions, in the wants of natural life, and it is almost always unconscious. Intelligence is the faculty of abstracting, of synthesizing, of creating. It solves the problems instinct submits to it, and when solved, instinct makes practical use of the fruit of intelligence. Mental disorders are divided into three groups: (1) Diseases of instinct—hysteria, moral insanity, obsessions, sexual psychopathies, *folie circulaire*; (2) Diseases of intelligence—delirium, monomania, hypochondria; (3) Mixed diseases of intelligence and instinct—mania, dementia, idiocy.

Insomnia.—Drapes[5] states that **Dial** (diallylbarbituric acid) is recommended for insomnia—$\frac{3}{4}$ to $1\frac{1}{2}$ gr. in mild cases, but in maniacal states single doses of $4\frac{1}{2}$ gr. may be required.

The Continuous Bath in Mental Disease.—Edward A Streeker[6] considers that the **Continuous Bath** (by this is meant a bath prolonged above two hours) has proved its usefulness in the treatment of mental excitement, and is the most satisfactory method of dealing with this state. He finds no untoward effects in properly selected cases, but recommends plugging the ears with cotton-wool saturated with liquid petrolatum. Kraepelin, who twenty years ago adopted this treatment in certain cases, regarded any existing ear disease as a contra-indication. The author also considers its use undesirable in advanced cardiac and pulmonary disease.

Herman M. Adler[7] also recommends the bath for states of restlessness and excitement. He uses the **Wet Pack** when the patient's ability to co-operate, or his suggestibility, is reduced to a negligible quantity. He applies the pack for two hours, and advises starting with hot sheets. In alcoholism or exhaustion he recommends a hypodermic of **Digalen** or **Digipuratum** or **Strychnine**. He found less effect in cases of manic-depressive insanity and in other cases, and says "it would appear that excitement in conditions other than manic-depressive insanity is to be considered rather as a secondary manifestation, and one which is more easily controllable by hydrotherapy."

Confusional States.—Tom A. Williams,[8] in an abridged paper on "The Management of Confusional States, with special reference to

Pathogenesis," states that confusion is a hall-mark of the effects of toxin upon the cerebrum. He gives instances of various toxic states due to different causes, and considers that treatment should be directed towards combating the etiological factor of the confusion. Thus, when the kidney is at fault, nitrogenous food must be diminished; when exhaustion has occurred, nutrition must be ample.

Manic-depressive Insanity.—Gordon Gibson,[9] in a paper on "The Relationship between Pelvic Disease and Manic-Depressive Insanity," reports that of 1064 women with manic-depressive insanity, 160 had lesions requiring operation. Of these, 56 have been operated upon; 36 were discharged as recovered; 6 have been re-admitted with other attacks. The author finds depression more frequent than mania, thus agreeing with Broun's findings. The percentage of recoveries in the series is 57 per cent, but he admits that the series is too small to justify any very conclusive statements. His conclusions are: (1) No mental improvement may be expected to follow an operation performed on the pelvic organs of a woman who is suffering from a psychosis which is characterized by dementia. (2) An operation for the correction of lesions in the pelvis is justifiable in a woman who has manic-depressive insanity, and some improvement may be hoped for if the operation is performed in the first or second attack. (3) The pelvic pathology is not the cause of the psychosis, but may act as the exciting cause of an attack in a woman of neuropathic stock. (4) The good effect of the operation may be an indirect one, by improving the general physical condition of the patient.

Mental Disorders and the War.

There is a general agreement amongst authorities that the strain of war has not produced any new or specific form of mental disorder. This applies both to soldiers and to civilians—to men exposed to shell shock or injury whilst on active service, and to men and women suffering from strain and anxiety at home in connection with air-raids or bereavement. Although there is such a marked and decided exciting cause of mental breakdown, investigation discloses the same familiar predisposing causes, and it remains difficult to assign the relative rôles of constitutional and innate tendencies and the direct stresses of warfare. If, as Percy Smith[10] and also von Hecker[11] have stated, an organic disease such as general paralysis of the insane may be precipitated by war strain, it is not surprising that the war has caused considerable development of the functional neuroses. These are dealt with in a separate article (*see* Shell Shock), and comparatively little has been published with reference to the psychoses, and no statistics are forthcoming as to incidence of insanity amongst soldiers.

One conclusion can safely be drawn, that the terrible strain of war upon the civilian population has produced much less declared mental disease than might have been anticipated. This is not only recognized by private practitioners, but the report of the Commissioners of the Board of Control shows a distinct reduction in the numbers of the

insane, as well as a reduction in the number of admissions to the public asylums. This decrease applies to both males and females, but as such a large number of men in the army are excluded, only the figures for women can usefully be quoted in this connection. For the year 1915 the women pauper patients decreased by 2 per cent, for 1916 by another 2 per cent. In 1915 the decrease in the women admitted was 2·7 per cent, in 1916 no less than 6·3 per cent. These figures are the more remarkable as this is the first time since 1859 there has been any decrease in the number of insane persons in the public asylums. It can hardly be assumed that the war has had a beneficial effect upon the mental health of the women of England. The explanation of the decrease is probably to be found in the improved circumstances of a large proportion of the working population. There has been little unemployment, wages have been high, and, during the period under review, conditions in respect to food have been exceptionally favourable. There has been, in consequence, less insanity, and it has been increasingly possible for friends to care for at home the elderly infirm patients who otherwise would have been placed in asylums. It is unwise, therefore, to draw any conclusions as to the effect of the war upon women. It is, however, significant that amongst private patients, who are little affected by the social conditions referred to, the numbers are practically stationary.

With reference to the nature of the psychoses in the mental disorders of warfare, Régis[12] analyzes 150 cases seen during the first year of the war. Of these, 86 had been actually engaged in battle ; 50 of the latter were definitely of unsound mind, and 38 may be classed as neuro-psychic. In describing the acute form of insanity due to the war, he points out that this closely corresponded in type with that observed as the result of explosion or earthquake. Two symptoms are prominent—hallucinatory dreaming and confusion. It is noted that few persons returning from fighting are free from dreams dealing with their recent experiences. The morbid dreaming which is characteristic of a war neurosis imposes itself on the patient as a reality, and is invariably present ; the patient lives over again what he has seen and heard. It is accompanied by intense emotion and excitement, and it may be so terribly vivid that the patient purposely keeps awake for fear of dreaming. Happily, in most cases, these terrifying dreams soon disappear and are replaced by dreams of a more ordinary nature.

This condition has been graphically described by Murray Auer[13] in relating his experiences at No. 23 General Hospital, B.E.F. "In the train of the neurotic manifestations, one difficult to combat was insomnia. Many were annoyed by the pounding of the heart sounds in their ears, but the majority simply 'could not get to sleep.' However, as most of the subjects were young, the insomnia was overshadowed by the occurrence of the horrible trench dreams, night frights, and somnambulistic periods suffered by many of these men. One became quite accustomed to seeing patients duck beneath their

pillows, rise from their beds weeping and trembling, or shouting loudly, and at times recounting some horrible experience. The night starts were particularly annoying, as many would awaken with terror, bathed in perspiration, but recalling no dreams. Others dreamed of being pursued by Germans with fixed bayonets, of being called to attention or into action and unable to find their clothing or their weapons, of a suffocating feeling across the chest, of losing the trench in the fog and of being unable to get back.

"The element of fear or anxiety was relatively uncommon, considering the wealth of fear-producing stimuli, but in the markedly neuropathic individuals one encountered a feeling of incompetence, a fear of doing something wrong and, consequently, being shot, a premonition of some impending danger, a fear that something might arise in which he would fail, or of going to sleep lest he should not awaken. Again, after a mine explosion, or a heavy bombardment, the dread of returning to the trenches and the fear of being hit were overweighted and conquered by the fear of loss of confidence or of the ridicule of their comrades; but, nevertheless, at the sound of the first shell they would frequently lose control of themselves, and, seized by an impulse of self-preservation, run and crouch, trembling, in the dirt.

"Depressing as are these manifold conditions, it is with intense pleasure that one sees the usually fortunate outcome of proper care, in their disappearance and the re-establishment of mental equilibrium. Under proper treatment, instituted early (and the first really opportune place is the base hospital), these cases make excellent, though sometimes slow, progress. Nothing is more difficult to overcome than a well-established neurosis. At the base hospital one can fairly well employ psychotherapy—in the form of absolute quiet, isolation, re-education, and persuasion—and medicotherapy, hydrotherapy, and lumbar puncture when indicated. I cannot insist too strongly upon the value of quiet, rest, and isolation, as practised by placing screens, when available, between the cots in the early control of these cases. No little word of praise, either, is due to nurses, who by their careful adherence to instructions, and by their tact and gentle care, have fulfilled their noble calling."

Associated with the dreaming is mental confusion and amnesia. Régis does not look upon this as a special variety of confusional insanity, but as akin to that occurring after sunstroke, or in the course of polyneuritis, or from toxæmia. Sometimes the amnesia is total, so that the patient forgets his name and his early memories; more frequently it is partial, so that the events subsequent to the shock or injury cannot be recalled. The behaviour of the patient during the clouding of his mind, and the ideas and delusions that may develop, are extremely varied; so also is the emotional tone—the patients may be excited, depressed, or in a state of extreme hebetude. Régis considers it extremely important to distinguish this disorder from mania. Confusional cases usually recover quickly, and should not be classed as insane, or committed to special hospitals or asylums.

"These patients, who are but momentarily overturned by an emotional shock, are no more truly insane than those who present stupor, confusion, or transitory delirium under the influence of typhoid fever, pneumonia, uræmia, or a surgical traumatism."

It has been noticed by many that war neuroses are rare amongst patients who are actually suffering from wounds. Wiltshire[14] and Eder[15] confirm this opinion, and the latter quotes in support the German authorities Hirstmann and Nonne. It is not easy to explain this, except on the supposition that wounds in some way relieve the patient from the internal mental stress which has contributed to psychical disturbance. Sometimes, no doubt, the wound itself claims the attention of the patient to the exclusion of other disturbing factors; but more often the manifest wound directly relieves the patient's mental strain.

Hotchkiss[16] summarizes the work during a year at the Renfrew War Hospital for mental invalids. The total number of cases received was 942. Of these, 111 had broken down in this country, and 831 had served in one of the expeditionary forces in France, the Mediterranean, East Africa, or Mesopotamia. All were patients who in civil life could be certified as insane, but under military administration certificates were unnecessary. Dealing with the patients who had seen active service, he classifies them as follows: manic-depressive insanity 21 per cent, alcoholic insanity 18 per cent, mental deficiency 18 per cent, confusional insanity 16 per cent, dementia præcox 14 per cent, paranoia 5 per cent, general paralysis 2 per cent, other forms of insanity 6 per cent. Of the 188 manic-depressive cases, only 31 were excited. The symptoms were similar to those in an ordinary hospital for the insane, except that their hallucinations and delusions, and consequently their conduct, were coloured by their experiences in the field. This, however, applied to all the groups. Under the head of mental deficiency were included all grades of mental weakness, and wonder is expressed how some of them could have passed the recruiting officers. The habitual criminals numbered 37, and there were 114 who had in a way been able to earn their living, and had learnt to drill, but were useless, if not dangerous, when tested by actual fighting. The confusional cases (134) constituted the more distinct group of war psychosis. Besides the confusion, there was often excitement, irritability, and hypersensitiveness. They presented increased reflexes, general muscular tremors, and sometimes hysterical symptoms. The vast majority occurred on active service, as a result of exposure to high-explosive shell fire, shell shock, and burial, or the fact of their comrades being killed. In the majority of these cases, however, a neuropathic predisposition was suggested by their appearance, and confirmed in most cases by their history before enlistment. With reference to dementia præcox, it is stated that "the history of many of the cases shows that very slight stress was sufficient to develop their illness, and that the first symptoms manifested themselves shortly after leaving this country and before they had been in the fighting line."

The recovery-rate is not of much significance when the figures of a single year are taken, but it is pleasant to find that 20 per cent of the cases recovered, and 16 per cent were discharged as relieved, a high proportion considering that none but grave cases were admitted.

References.—[1]*Shell Shock*; [2]*Jour. Ment. Sci.* 1917, Jan., 96; [3]*Ibid.* 1916, Oct., 730; [4]*Ibid.* 790; [5]*Ibid.* 1917, Jan., 123 (abstr. from *Progrès Méd.* 1916, April 5); [6]*Jour. Amer. Med. Assoc.* 1917, June 16, 1796; [7]*Boston Med. and Surg. Jour.* 1916, ii, 673; [8]*Med. Press and Circ.* 1917, Sept. 5, 172; [9]*Amer. Jour. Obst.* 1916, Sept., 439; [10]*Proc. Roy. Soc. Med.* 1916, Dec.; [11]quoted in *Mental Hygiene*, 1917, July, 430; [12]*Boston Med. and Surg. Jour.* 1916, ii, 784; [13]*Mental Hygiene*, 1917, July, 386; [14]*Lancet*, 1916, i, 1207; [15]*War Shock*, 3; [16]*Jour. Ment. Sci.* 1917, April, 243.

MERCURIAL STOMATITIS. (*See* Stomatitis, Mercurial.)

MERCURIC CHLORIDE POISONING. (*See* Poisoning by Mercuric Chloride.)

MOLES.

Solutions of **Quinine** and **Urea Hydrochloride** in (p. 25).

MORAL IMBECILITY. (*See* Imbecility, Moral.)

MOUTH, ANTISEPTIC APPLICATIONS FOR.

W. H. Dolamore, M.R.C.S., L.D.S.

Goodrich,[1] working in the Radcliffe Infirmary, Oxford, undertook an investigation to test the action of various drugs on the common organisms of the mouth. The experiments were made with pure and mixed cultures of organisms from pyorrhœa pockets; and contained, among other bacteria, streptococcus, pneumococcus, pneumobacillus, staphylococcus, and *B. coli*. The results showed that **Boracic Acid** in saturated solution (4 per cent) was unsatisfactory. **Emetine Hydrochloride,** even in 1 per cent solution, was no better than boracic acid. *Entamœba gingivalis*, even after twenty to forty minutes in such a solution, were alive and putting out pseudopodia. **Harmine Hydrochloride** in 0·5 per cent solution killed amœbæ instantly, but the germicidal power equalled emetine in 1 per cent solution. Its poisonous action renders its use undesirable. The **Hypochlorite** solutions, being unstable, she does not regard as satisfactory, and though **Chloramine T** prevented subsequent growth on films submitted for fifteen seconds, it is contra-indicated by its chlorinous taste and possible action on teeth and fillings. **Hydrogen Peroxide** she regards as being too readily reduced to be used by an ordinary patient. **Permanganate of Potash** has an unpleasant taste, stains the teeth, and is a weak antiseptic. **Flavine** and other dyes are obviously contra-indicated for general use by their tinctorial properties. **Zinc Sulphocarbolate** (zinc phenol parasulphonate), even in 10 per cent solution, did not produce complete sterility after half to two minutes. **Iodine,** even in such weak solutions as 1–3000, is a splendid antiseptic, but, apart from its destructive action on tissues, is obviously not a satisfactory general mouth-wash.

The results of her experiments placed **Thymol** in a pre-eminent position as a general mouth-wash in the form of a saturated aqueous solution (1–1200 or 1–1500). In the experiments with this solution there was growth from the control, but none after the action of the solution except in one or two instances, which were attributed to the presence of spore-forming bacteria. A saturated solution produced more effect in one minute than a half-saturated solution did in four minutes. Thymol is a constituent of many known mouth-washes, but a home-made solution is much less expensive. Since the paper, some have written to suggest that a saturated solution produces a certain irritative effect on the oral mucous membrane. In pyorrhœa she suggests massage of the gum with the thymol solution. For this purpose, and as a gum-wash, Talbot[2] recommends—

℞	Zinc. Sulphocarbol.	gr. lx	Aq. Dest.		℥ij
	Alcohol	℥j	Ol. Gaultheriæ		gtt. viij

and as a local application to be painted on in these cases—

℞	Aq.	grms. x	Iodi		grms. xxv
	Zinc Iodide	grms. xv	Glycerini		grms. x

Wells[3] recommends the following solution as a spray for the throat :—

℞	Quin. Hydrochlor.	grms. v	Glycerini		c.c. ccl
	Sod. Desoxycholatis	grms. xl	Aq.		ad c.c. m

also tablets containing :—

℞	Sod. Desoxycholatis	gr. j	Ol. Menth. Pip.		℥ $\frac{1}{2^{\frac{1}{6}}}$
	Quin. Ethyl. Carb.	gr. $\frac{1}{8}$	Glycyrrhiz. Ammon.		gr. ij

Also with flavine 1–1000.

This mouth-wash is based on the fact that bile salts have a solvent action on pneumococci and also on amœbæ, etc. He states that it also has a considerable bactericidal action on cocci not bile-soluble, and that he has proved its action on amœbæ in cases of pyorrhœa : but whether amœbæ are causative factors in such cases is more than doubtful. (*See* Pyorrhœa Alveolaris.)

Taylor and McKinstry[4] in fusospirillary peridental (or ulcerative) gingivitis use mouth-washes of **Peroxide of Hydrogen** or **Chlorate of Potash,** with **Carbolic Acid** after every meal. In their treatment after the teeth are scaled, the gums, etc., are cleansed with a spray of **Glycothymoline,** and then, after drying, the gums are painted with a 0·2 per cent alkaline solution of **Salvarsan** or **Kharsivan** as prepared for intravenous injection. This is repeated once or, better, twice a day. They have also used a mixture of **Vinum Ipecacuanhæ, Liquor Arsenicalis,** and **Glycerin,** and also a 10 per cent solution of **Quinine** and **Colloidal Preparations** of iodine and silver. Incidentally it may be mentioned that they draw attention to tooth-brushes kept together as one way in which infection is carried in this disease.

References.—[1]*Brit. Med. Jour.* 1917, i, 473 ; [2]*Jour. Amer. Med. Assoc.* 1917, i, 420 ; [3]*Brit. Med. Jour.* 1917, ii, 6 ; [4]*Proc. Roy. Soc. Med.* (*Odont. Sect.*), 1917, Jan., 8.

MYALGIA.

Colloidal Sulphur recommended (p. 31).

MYXŒDEMA.. *Herbert French, M.D., F.R.C.P.*

That the same preparation of **Thyroid Extract** varies greatly in its efficiency from time to time, and that different brands vary much in their therapeutic effects is familiar. The difficulty is to obtain a standardized preparation. E. C. Kendall[1] records some researches he has made with the view of obtaining the active constituent of thyroid gland in crystalline form. His work has been done in the Mayo Foundation, Rochester, Minn., and he has obtained a body which contains 60 per cent of iodine, which is crystalline, and which he designates alpha-iodine compound. *Fig.* 79 illustrates the crystalline form of the substance. That the alpha-iodine compound produces the effects that one required of thyroid extract is evidenced by the illustrations he gives of patients treated with it. *Plate XXXVIII* shows two of his cases.

Fig. 79.—Crystals of the alpha-iodine compound, which is the active constituent of the thyrodi gland. *Redrawn from the 'Boston Medical and Surgical Journal.'*)

Reference. — [1] *Boston Med. and Surg. Jour.* 1916, ii, 557.

NÆVI. *E. Graham Little, M.D., F.R.C.P.*

Newcomet,[1] while expressing the opinion that the best treatment for nævi is **Radiation**, a view which is not universally held by any means, gives the following sensible cautions to be observed in applying that form of treatment: (1) There is no ideal method for the treatment of 'birth-marks.' (2) While certain methods are better adapted to certain classes of these 'marks,' the results obtained depend largely upon the experience of the operator. (3) Any form of radiation employed in the treatment of nævi is attended with some risk. (4) Whatever method is selected or employed, the first application should not be exaggerated. It is easy to repeat the process, but difficult to remove the scars. (5) Consideration must always be given to the trophic influence, which differs in proportion to the size and depth of these vessels, and is difficult to control. (6) The earlier in infancy some form of treatment is adopted, the better will be the result, as involution will often continue when once a retrograde process is started, until the 'mark' disappears entirely.

Quinine and **Urea Hydrochloride** recommended (p. 25).

Reference.—[1] *Surg. Gyn. and Obst.* 1917, i, 604 (abstr.).

PLATE XXXVIII.

MYXŒDEMA: TREATMENT BY ALPHA-IODINE COMPOUND

Appearance of patient on entering the clinic.

After 18 days' treatment, during which the patient received a total of less than $\frac{1}{3}$ gr. of alpha-iodine compound.

Appearance of patient on entering the clinic.

After 6 months' treatment with the alpha-iodine compound; patient had grown $3\frac{1}{2}$ inches.

Redrawn from "The Boston Medical and Surgical Journal."

NAILS, CONGENITAL ABSENCE OF. *E. Graham Little, M.D., F.R.C.P.*

O'Neill[1] reports a singular case of a woman, age 26, with entire absence of nails on the hands and on the big toes, and fragmentary remains of nails on some of the toes. Two sisters of the patient had the same defect. The full family history is thus given :—

Brother	Age 28	..	With nails
Sister ..	,, 26	(My patient)	Without nails
,, ..	,, 25	..	,, ,,
,, ..	,, 21	..	With nails
,, ..	,, 19	..	,, ,,
,, ..	,, 6	..	Without nails

REFERENCE.—[1]*Lancet*, 1916, ii, 977.

NAILS, TRANSVERSE RIDGES ON. *Herbert French, M.D., F.R.C.P.*

It is an old observation—with which many men in general practice seem unfamiliar, presumably because their attention was never drawn to it as students—that whereas longitudinal ridges on nails generally mean nothing in particular, transverse ridges are important evidence of previous disease. If one finds only a single finger nail with a transverse ridge, the probability is that the terminal phalanx of that finger has been injured ; it may have been hit against something, or damaged by pushing the cuticle back too energetically in the process of manicure ; but when one has a patient with a symmetrical transverse ridge on nearly every nail of both hands, the probability is that it is due to previous ill health. It serves as a telltale which may be of service in many ways. For instance, one may notice these ridges when examining a man for life insurance ; he may state that he has had no recent illness, but the ridges indicate the contrary. Or, again, when a person comes and complains of all kinds of ills, and one is inclined to conclude that the whole trouble is neurotic, transverse ridges on the nails may indicate that there is real disease at the back of the story. The illness need not have been severe enough to confine the patient to bed ; one may see the ridges, for instance, in cases of early phthisis, with its recurrences of general seediness ; and they may then serve to make one even more careful than usual in examining the sputum for tubercle bacilli, or in other ways testing the diagnosis.

The explanation is that at the time of ill health the matrix of the nail suffers in nutrition like the rest of the body, and produces that particular sample of nail poorly ; as the nail grows forward from the matrix, the poorly-produced part remains in evidence long after the illness to which it corresponds has gone by. The nail takes something like four or five months to grow from the matrix to the tip, the rate varying in different persons. The nail that is produced by the matrix during the first week in January does not become visible beyond the cuticle till towards the end of the month, and it is pushed slowly forward by the fresh nail that is constantly being formed from the matrix until it is ready to be cut off in the ordinary process of

paring the nails about April or May. Broadly speaking, one may say that if there is a general transverse ridge about halfway along the nails, this corresponds to an illness or ill health about three months previously ; if the ridges are nearer to the tips of the nails, they relate to an illness four or five months previously ; and if they are closer to the cuticle, the illness was less than three months previously—two months or one. One can thus date the time of an illness with fair accuracy in some cases by looking at the nails. *Plate XXXIX* illustrates one type of these pathological nail-ridges ; the patient had had lobar pneumonia just over three months previously.

One does not wish to give the impression that *every* case of illness is succeeded by transverse ridges on the nails. They result in only a small proportion of all cases ; but this does not detract from their importance when they do occur.

In making the examination, one looks for two things, either or both of which may be present. One is an actual change in the contour of the nail—either a bulge or a hollow ; the other simply an alteration of colour, generally a slightly-curved white line across the otherwise pink nail. One may see two or more such paler bands across the nails when there has been recurrent illness—for instance, after rheumatic fever with relapses. In some cases the patient has had three separate attacks of rheumatic fever at intervals of about a month, and has subsequently exhibited three distinct and separate pale bands across all his nails—one band for each attack. The most marked case I ever saw was in a patient in Guy's Hospital, in whom recovery occurred after lobar pneumonia of extreme severity ; at the time of this pneumonia the matrices of the nails practically stopped making any nail at all ; so that later on, each nail showed a complete interruption at the level corresponding to the date of the illness. The interruption was an overlapping one, and one could slip the corner of a visiting card into it ; so that the patient could hold his hands out, each with five visiting cards stuck into the breaks in the finger nails. So marked an evidence of previous malnutrition is of course exceptional.

The main point for the general practitioner is that the transverse ridges are evidence of illness at the time corresponding to the date at which the ridged part of the nail was produced. One must be careful, however, not to mistake for disease-produced transverse ridges those less regular white lines that may result from manicure. If one pushes back the cuticle of the nail rather too forcibly, the matrix is apt to be interfered with, and subsequently a white mark corresponding to the date of that manicure will make its appearance. In such cases, however, there is never a perfectly even line across the nail such as those shown in the plate ; the manicure white lines are irregular and more or less interrupted—white dots and spots. It is perfectly easy to distinguish the effects of manicure from the white lines due to previous disease ; when looked for, it is remarkable how many patients show them.

PLATE XXXIX.

TRANSVERSE RIDGES ON NAILS

From a water colour sketch of the nails, showing a uniform white band and transverse ridge due to lobar pneumonia three months previously.

NASAL ACCESSORY SINUSES. *J. S. Fraser, M.B., F.R.C.S.*

Headache.—Gruenwald has stated that localization of pain by the patient is most uncertain, but that tenderness on palpation is of considerable diagnostic value. Wilson[1] finds that pain due to pressure of the middle turbinate on the septum is a dull frontal ache, usually homolateral. There may also be a pressure feeling over the bridge of the nose. Pressure of the inferior turbinal on the septum rarely causes pain. In cases of acute suppuration in the maxillary antrum, the pain is chiefly located in the upper jaw and teeth, and there is marked infra-orbital tenderness: there may be pain over the malar bone. In chronic antral cases we have the dull frontal ache, made worse by holding the head down, with tenderness on firm pressure over the exit of the infra-orbital nerve; there may be pain in the side of the nose. In cases of ethmoidal suppuration and polypi, there is usually a dull ache over the vertex, and deep tenderness on pressure near the inner canthus; less often there is frontal pain. When the frontal sinus and anterior ethmoidal cells are affected, the headache is frontal and is generally homolateral; there is also trochlear tenderness. In sphenoidal sinusitis there is usually a dull ache between the eyes, made worse by mental or ocular exertion; there is also a dull ache in the occipital region; occasionally there is pain over the great wing of the sphenoid or pain in the frontal region; in rare cases the pain radiates to the ears.

Maxillary Antrum.—Syme[2] states that it was formerly held that for the production of choanal polypi an accessory antro-nasal ostium (situated posteriorly to the usual ostium) was necessary. In the majority of cases, however, no such accessory opening exists. [We do not agree.—J. S. F.] The polypus arises in the neighbourhood of the ordinary ostium in the middle meatus, where the configuration of this passage, the air current, and the effect of gravity in the lying position determine its gradual passage to the posterior naris. All antro-nasal polypi are not antro-choanal, but it is not unusual to find antro-choanal associated with antro-nasal polypi. All choanal polypi are not antro-choanal, though in most of Syme's cases of choanal polypus, lavage of the antrum has given a positive result. Removal of the choanal polypus may or may not be followed later by recurrence. It is, therefore, a sound rule that antro-choanal polypus should be treated by the radical operation on the antral cavity.

The sinus is punctured and washed out by the way of the inferior meatus, and then dried by means of the air-bag. Twenty min. of a 15 or 20 per cent solution of cocaine, with the addition of 6 or 7 min. of 1–1000 adrenalin, are then injected through the cannula by a hypodermic syringe, and a little air is blown in to spread the solution over the lining membrane. The anterior part of the inferior turbinate and inferior meatus is dealt with by means of pledgets of cotton-wool soaked in the same solution. The region of the canine fossa is anæsthetized by the submucous injection of 1 per cent cocaine. This injection should be carried down to the bone. (In nervous patients

a hypodermic of morphia is given an hour before operation.) Even when it is decided to use general anæsthesia, Syme is in the habit of treating the nose and antral cavity in the way just described, but refrains from the injection in the canine region.

Sphenoidal Sinus.—Watson Williams[3] holds that inspection of the operative field must always be imperfect in opening the sphenoidal sinus, however thoroughly the bleeding may be stanched. After the partial removal of the middle turbinate, the sense of touch is, in his experience, a far more accurate and delicate guide. Watson Williams has opened several hundred sphenoidal cavities without any serious drawback. He prefers a general anæsthetic, and always operates with the patient supine. Preparation consists in spraying the nasal passages with warm saline solution, followed by weak adrenalin solution with cocaine. The instruments are: (1) An ordinary nasal speculum; (2) The straight blunt exploring cannula; (3) A small and a large-size spheno-ethmoidal punch forceps. Both the cannula and forceps are marked in inches. Exploration is the first step in the operation, firstly for establishing evidence of sphenoidal sinus disease, and, secondly, in order to measure the distance from the tip of the patient's nose to the anterior and to the posterior sphenoidal-sinus wall (*Plate XL, Fig. A*). The cannula goes through the thin anterior wall. We may find that the anterior wall is three inches from the nose tip and the posterior wall four inches. Williams first passes the forceps into the sinus. He then opens the blades and draws them forward till they are arrested by the posterior surface of the anterior wall. (The male forceps blade is at right angles to the stem when opened, and is therefore larger, so to speak, than when closed.) Closing the blades, Williams draws the instrument out about one-eighth of an inch. On opening the blades again it is found that the male blade is in front of the anterior wall, while the female blade is inside against the posterior surface of this wall. Thus, when closure is made, a piece of the anterior wall is punched out. The anterior sinus wall is thus quickly clipped away, upwards, outwards, inwards, and downwards, by rotating the forceps as one clips the wall away (*Plate XL, Fig. B*). In a straightforward case, one minute suffices to remove the whole face of the sinus. In cutting upwards one takes care to avoid pressure by the female blade against the roof of the sinus. In cutting outwards one should be cautious for fear of wounding the cavernous sinus. There is less fear in cutting freely inwards and downwards. After two or three clips with the small forceps, the orifice is large enough to take any of the larger sizes. One thus obtains very free opening of the sinus, *without having to remove any portion of the middle turbinate*, though, if there are special conditions rendering the removal or partial removal of the middle turbinal desirable, there is nothing to prevent one's doing so. Williams believes that removal of the middle turbinal may lead to crusting and dryness of the pharyngeal mucosa. When, as rarely happens, polypi have formed in the sinus, it is better to pick them out with blunt

PLATE XL.

OPERATION FOR DRAINAGE OF SPHENOIDAL SINUS

Illustrations kindly lent by Dr. Watson Williams.

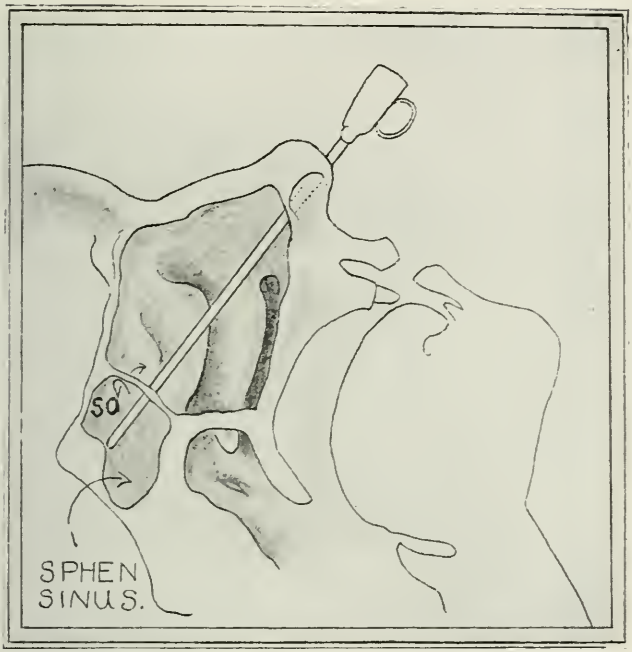


Fig. A.—The arrow shows the position of the cannula at the normal sinus ostium, S O.

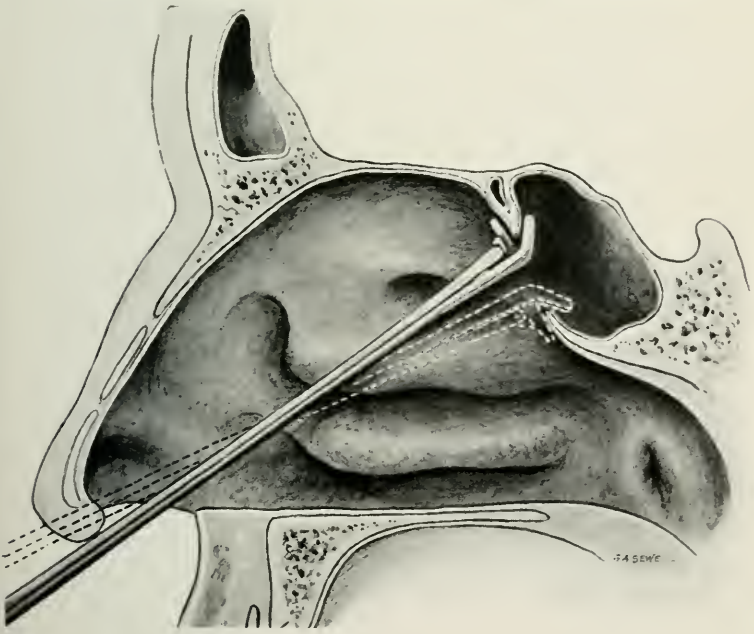


Fig. B.

OPERATION FOR DRAINAGE OF SPHENOIDAL SINUS—*continued*

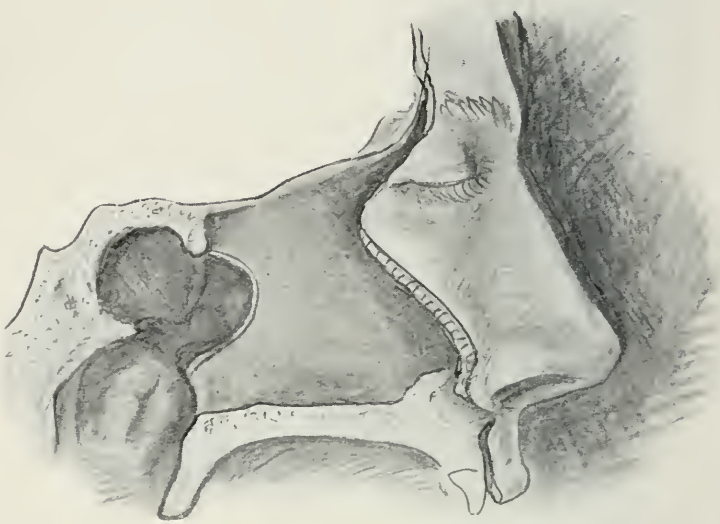


Fig. C.

Fig. D.—C O, optic canal; C I, prominence formed by carotid canal on outer wall of sinus. (*Sieur et Jacob.*)

polypus forceps. When both sinuses have to be opened, Williams thinks a better procedure is to remove the posterior half-inch of the nasal septum above the choanæ narium, and then continue the removal backwards, so as to remove most of the intersphenoidal sinus septum, and thus throw both cavities into one (*Plate XLI, Fig. C*).

The following dangers must be avoided in operating on a sphenoidal sinus: (1) Missing the sphenoidal sinus and taking a direction upwards to the roof of the nasal passage. (2) When the sinus is exceptionally large and deep, the cavity may extend backwards so that only a very thin plate of bone separates the sinus from the medulla oblongata (*Plate XLI, Fig. D*). One must avoid using any force, and carefully feel for the impinging of the distal end against the posterior wall. (3) The canal for the optic nerve very frequently runs along the upper and outer walls of the sphenoidal sinus, and may have a very thin bony covering. (4) The outer wall, forming the inner boundary of the cavernous sinus, must be treated with great caution. (5) Hæmorrhage from the sphenopalatine artery, as it crosses beneath the lower margin of the anterior sphenoidal wall to reach the nasal septum, may occur. Injury to the artery is more likely to cause trouble if the vessel is only partly divided. In one patient it became necessary to *ligate the external carotid artery*, when the hæmorrhage at once ceased. Hæmorrhage from this source may occur for the first time several days or even a week after the operation. Not more than one per cent of cases is attended with troublesome primary or secondary hæmorrhage.

After-treatment consists in lavage of the sinus till the purulent secretions diminish or disappear. In some cases it is advisable to mop out the sinus with colloidal silver solution or iodine. For the first week after operation it is well to spray the nose with cocaine solution before lavage.

Operation on the Nasal Sinuses by the Trans-septal Route.—Norman Patterson[4] has endeavoured to improve on the route of approach to the ethmoidal cells and sphenoidal sinus. The ethmoidal cells are usually got at through the nasal cavity of the same side, or by external incision. The latter leaves a scar on the face, while the former does not give a really good view of the field of operation. Patterson, like others, has been struck by the excellent display of the opposite side of the nose obtained through a large perforation of the septum when this is present, and now proposes to operate by making a temporary artificial perforation of the septum. The simplest plan is to carry an oblique incision through the whole thickness of the septum. This should commence about half an inch from the nasal orifice, and be carried from above downwards and backwards for about three-quarters of an inch. Through this incision the blades of the speculum are introduced. The objection to this procedure is the considerable resistance met with. This, however, may be overcome by making two incisions through the whole thickness of the cartilaginous septum, extending backwards from either end of the primary oblique incision,

and thus creating a temporary swing door. It is preferable, however, to make a preliminary submucous resection of the septum, making an incision in the mucoperichondrium of the distal side of the septum from a quarter to half an inch behind the incision made on the proximal side. When the ethmoidal operation has been completed, the edges of both incisions can be brought together by a few fine sutures; but it is well to avoid packing the nasal cavities at the end of the operation, though an anterior plug kept in for twenty-four hours will do no harm. Patterson believes that the best method is to do the submucous resection ten days before the operation on the ethmoid. This method is also applicable to intranasal operations on the frontal sinus, on the lachrymal sac, and on the maxillary antrum.

Calomel fumigation for local treatment of syphilitic and septic conditions of the upper air passages, etc. (p. 19).

References.—[1]*Med. Chron.* 1917, 1; [2]*Jour. Laryngol.* 1916, 515; [3]*Bristol Med.-Chir. Jour.* 1916, 157; [4]*Brit. Med. Jour.* 1917, ii, 513.

NASAL AFFECTIONS, INTERNAL SECRETIONS IN. (*See* Internal Secretions.)

NEPHRITIS. *John D. Comrie, M.D.*

Attention is drawn by Coplin[1] to the fact that there is a type of renal anomaly of developmental origin which predisposes to or renders inevitable some form of nephritis, and that this congenital abnormality is probably primarily a defective arteriogenesis early in the development of the organ. Although both kidneys may be involved, the hypoplasia is rarely bilateral, and certainly not symmetrical. Usually the organ chiefly affected weighs a quarter or less of the weight of the other, which often shows compensatory hypertrophy. The decrease in size is of almost equal frequency in the right and in the left, and changes are always found in the arteries of the kidney; it is to these changes that the author attributes the defective development. He considers that the symptoms of atypical cardiorenal cases are often due to this defective development, and that the condition should be capable of clinical recognition by means of the functional tests now in use—if necessary by the study of the excretion from the two ureters separately.

Treatment.—It is maintained by Umber[2] that abuminuria is of no importance as regards prognosis in kidney disease, the highest amount of albumin being found in the nephroses or epithelial types of kidney disease, while the real tests as to prognosis he holds to be the diluting power of the kidney, the degree of nitrogen retention, and the blood-pressure findings. In the nephroses (tubular nephritis) he considers that little water should be given, and that avoidance of salt is important. In glomerular nephritis, on the other hand, he increases the supply of water. **Venesection,** combined with injection of **Hypotonic Saline** or of **Grape-sugar Solution** direct into the vein,

is very useful in azotemic kidney disease. When uræmic convulsions ensue from œdema of the brain, and when there is retention of water and salt in the tissues of the nervous system, **Lumbar Puncture** is an excellent remedy.

The use of **Suprarenal Extract** in certain types of nephritis has been strongly advocated by several writers. Ercolani[3] explains that the suprarenals are liable to be affected by any general cause which produces inflammation of the kidneys. Thus, in diphtheria, the eruptive fevers, typhoid, and pneumococcal infections, there are often changes in the myocardium and nervous system which are nowadays regarded as indirect effects of suprarenal insufficiency. Further, he believes that suprarenal extract administered as a drug has, by its vasoconstrictor effect, a protective influence on the kidneys. Harris[4] also records his results in the treatment of nephritis by **Adrenalin** (which he administers in doses of 10 min. of 1–1000 adrenalin solution, hypodermically or by mouth). The immediate effect of the administration is to augment considerably the amount of urine excreted, but if the dose be too often repeated a diminution subsequently takes place. Careful trial is necessary to discover the appropriate dosage in each case.

As regards the dietetic treatment of nephritis, Chace and Rose[5] have published some observations controlled by chemical examination of the blood. They point out that a mature man of average size need not consume more than 40 grms. of protein daily, and that under stress of circumstances he can get along with less, while, with an increase of total fuel value, the level on which protein metabolism can be maintained is proportionately lowered at the expense of extra fats and carbohydrates. A very important point is that **Vegetable Proteins** differ in the number and proportions of the amino-acids which compose them, and therefore differ in nutritive value. The foods as we eat them contain more than one kind of protein, and therefore an inadequate protein may be supplemented satisfactorily by another in the same food, or obtained by adding another foodstuff. A day's energy requirement of over 2000 calories, with protein not exceeding 60 grms., is made up from a diet such as the following :—

Morning	Noon	Evening
Citrus fruit Cereal— Farina, oatmeal or banana Cream Toast Beverage	Cream soup— Plain, rice, celery, asparagus, spinach Chief vegetable— White potato, baked or mashed with butter, sweet potato, banana Lettuce salad with oil Cocoa	Rice, steamed, with cream, or baked banana, or as pudding Corn-starch blancmange and cream Banana Milk

Other foods may have to be included in this outline, and of those included, not all are to be considered on a par. Farina should be given more often than oatmeal. Of the soups, the plain soup or cream of rice or potato is preferable, but to break the monotony celery or asparagus may be served on rare occasions. In green vegetables, spinach and string beans are the best.

As regards the use of diuretics in nephritis, Christian[6] considers that in uncomplicated cases they should generally be avoided. Where a toxic condition is threatening, he considers **Bleeding** is a better remedy, and for reduction of œdema he advocates diminution of fluid intake, stoppage of salt, poor diet, sweating, and purging. When, however, cardiac insufficiency is present, he considers **Theocin** one of the best agents in removing œdema, especially if it is administered after a course of **Digitalis.**

In the treatment of parenchymatous nephritis (nephrosis), as distinguished from interstitial nephritis, Epstein[7] has found benefit from putting the patients on a **Protein Diet** (from 80 to 200 grms. of protein daily), with a small quantity of carbohydrate and a restriction of fats. The total food value of this diet ranges between 1200 and 2400 calories, and he claims as benefits that it (*a*) ameliorates anæmia, (*b*) increases the protein content of the blood-serum, and (*c*) diminishes the fat-content of the blood, so that a proper interchange of fluid between tissues and blood is re-established.

War Nephritis.

The nature of the nephritis which has affected all the belligerent armies, since the summer of 1916 especially, has been a matter of considerable discussion. Davies and Weldon[8] point out that in some hospitals war nephritis has, since the early part of 1917, taken the place, so far as incidence goes, of the formerly common trench fever. These writers had a case-mortality of 4 per cent in this disease, and they made autopsies in most of their cases. Unlike most others who have published pathological results, they did not find the glomeruli specially affected, but noted degeneration of the epithelium in the convoluted tubules, and, generally speaking, the appearances characteristic of cloudy swelling, both to the naked eye and with the microscope. Sundell and Nankivell[9] publish a careful clinical study of the condition, in which they note that the incidence of the disease is commonest in the decade 25 to 35, especially about the age of 31, and a history of previous renal disease can rarely be obtained. They also draw attention to a fact which most writers on the subject point out, that some degree of bronchitis is a constant feature, and that it often forms a serious complication. All their cases showed casts in the urine, and about 70 per cent had blood as well. All the cases were peculiar in that large endothelial cells were present in the urine; the authors, like other writers, noted the frequent occurrence of leucocytes in large quantities. No cultural results were obtained

either from the urine or from the blood, which was examined in two cases.

The causation of the condition has been discussed by Langdon Brown.[10] The various theories that have been offered are—exposure, water-supply containing chlorine or some metallic impurity, diet containing an excess of protein and deficient in fresh vegetables, etc., suppressed scarlet fever, and infection, either by some micro-organism like the *Bacillus coli* or by a filter-passing virus. Brown favours the last-mentioned hypothesis. Most of the remaining theories can be dismissed, except as accounting for cases now and then ; but, as an explanation of the epidemic occurrence of nephritis, the theory that the resistance of the kidney is lessened by excessive protein dietary and by a mildly scorbutic state certainly finds most adherents at the present time.

The occurrence of a special clinical type of acute nephritis with nitrogen retention (*néphrites aiguës azotémiques*) among the French troops is described by Ameuille.[11] The special characters are a rapid rise of temperature, with more marked oscillations than are shown by enteric fever, rapid and irregular pulse, general malaise, vomiting, headache, diminution of the urine, which contains few casts but many leucocytes and much albumin ; and finally there is great increase of the urea in the blood. In this type also bronchitis is a regular symptom. The condition runs its course usually in about fifteen days, but it is apt to develop seriously or fatally. The pathological changes found in the kidneys consist of focal interstitial inflammatory areas scattered through the organs, and in protracted cases, degeneration of the glomerular and tubular epithelium in addition. Ameuille attributes the disease to an abnormal fragility of the kidneys brought about by military—and especially by trench—life, so that these organs become affected by mild infections which have no effect upon the other more robust viscera.

War nephritis is a well-recognized condition among the German troops, as shown by Magnus-Alsleben,[12] who states that it is generally agreed that war nephritis is not a new disease, but is the well-known acute glomerular nephritis which is a common sequel to scarlatina. By the Italians the epidemic nature of trench nephritis is recognized in a paper by Giugni,[13] and its febrile character is mentioned by him, as also by Silvestri.[14]

Treatment suitable to the condition is detailed by Michell Clarke.[15] **Rest in Bed** is important in all cases, until either the albumin and casts have disappeared, or it has become evident that there is no prospect of a complete cure. Severe cases are best treated by **Milk** only, and others on a fixed **Diet** of milk 2½ pints, bread 6 oz., rice 1 oz., butter ½ oz., potatoes 4 oz., greens 4 oz., jam 1 oz., and fruit occasionally. As improvement takes place, bread may be increased to 8 oz., and the yolks of one or two eggs added. **Avoidance of Salt** is important except in cooking green vegetables, and **Sodium Carbonate** is given (10 to 15 gr. every hour in 8 oz. water) for the purpose of

increasing diuresis and of neutralizing strongly acid urine. With the alkaline treatment may be combined **Digitalis** and **Caffeine,** which are more efficient combined with the soda than when given alone.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* 1917, Mar., 381 ; [2]*Berl. klin. Woch.* 1916, Nov., 1261 (reference in *Jour. Amer. Med. Assoc.* 1917, Feb., 406) ; [3]*Gaz. degli Ospedali*, 1917, Mar., 321 (reference in *Jour. Amer. Med. Assoc.* 1917, June, 1670) ; [4]*Med. Press and Circ.* 1917, June, 528 ; [5]*Jour. Amer. Med. Assoc.* 1917, July, 440 ; [6]*Canadian Pract. and Rev.* 1917, July, 269 ; [7]*Jour. Amer. Med. Assoc.* 1917, Aug., 444 ; [8]*Lancet*, 1917, ii, 118 ; [9]*Ibid.* 414 ; [10]*Trans. Med. Soc. of Lond.* 1917, 41, and *Pract.* 1917, 111 ; [11]*Presse Méd.* 1916, Nov. 2, 489 ; [12]*Brit. Med. Jour.* 1917, ii, 128 (abstr. from *Münch. med. Woch.* 1916, Dec. 12) ; [13]*Policlinico*, 1917, Aug. 5. 977 ; [14]*Ibid.* 986 ; [15]*Brit. Med. Jour.* 1917, ii, 239.

NEPHRITIS IN CHILDREN. *Frederick Langmead, M.D., F.R.C.P.*

After summarizing the literature connected with the operations of Edebohls and Harrison in cases of nephritis, J. L. Morse[1] deals more particularly with Edebohls' operation as applicable to children. He could discover only three instances in which it had been employed for *acute nephritis,* and added two more from his own practice. The results of **Decapsulation** of the kidneys in these acute cases were encouraging. It appears probable that all five children would have died in a few hours had no operation been performed. If this is true, it is evident that the operation saved the lives of four of them, at least for the time. Except in one case there are no data as to whether recovery was complete. In this instance the boy, after one year, was not only free from symptoms, but his urine had been normal for some time. Decapsulation should be undertaken, therefore, only in those cases in which there is a marked diminution in the amount of urine and symptoms of intoxication are developing. Under these conditions it is not infrequently a life-saving operation, and he considers that every patient should be given the chance which the treatment affords.

From the literature Morse was able to collect 19 cases of *subacute* and *chronic nephritis* in children in which decapsulation of the kidneys had been done, and he has had the operation performed in four of his own cases. One patient was well after eight months, although it appeared certain that otherwise the case would soon have ended fatally; the other three were benefited, two very considerably. He thinks that the operation should always be considered in cases of chronic nephritis in childhood which are not responding reasonably well to medical measures.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 525.

NERVES, GUNSHOT WOUNDS OF. *J. Ramsay Hunt, M.D.*

Byron Stookey[1] gives an interesting study of gunshot wounds of peripheral nerves. The nerve injuries in the upper extremity greatly outnumber those in the lower.

The ideal operative procedure would be primary suture. This, however, is hardly ever possible in war surgery, as nearly all wounds

are infected. Operative procedure, therefore, is necessarily delayed, and rendered more difficult because of the excessive scar-formation. Scar tissue widely infiltrates the deeper tissues, and often becomes extremely dense. In those wounds in which there has been a fracture with infection—unfortunately this was a most frequent complication—scar tissue is enormous in amount, callus large, and the area of nerve involved extensive.

Peripheral nerves may have been injured by direct violence of the bullet or shell, or indirectly by the velocity of the bullet and the transmission of its vibration, causing concussion or contusion, usually both. In some instances there appears to have been a hæmorrhage in the nerve trunk. In injury by direct violence the nerve may be completely or only partially severed. This seems to depend on the size of the nerve. He has never seen the sciatic nerve completely severed. Nerve lesions, when seen later, usually show the nerve involved in a mass of scar tissue, in many instances extremely dense. When the nerve is completely severed, the proximal end is usually bulbous, hard, and slightly irregular; the distal end small, frayed, lost and diffused in surrounding scar.

Considering, then, the nature of these nerve injuries, we may have either complete anatomical or physiological, or incomplete anatomical or physiological division. Unfortunately, we are not able before operation to distinguish between a complete anatomical or physiological lesion. Both destroy conductivity of the nerve. Hence both manifest themselves functionally in the same manner, or are characterized by incomplete lesions. The extremities show a glossy, shiny, mottled, red skin, tender in parts to nearly all stimuli. The skin is usually drawn tight over the fingers, and the subcutaneous tissue appears to be small in amount. There is usually sweating, which is markedly acid and of strong odour.

In cases of complete division, either anatomical or physiological, operations should be performed as soon as the primary wounds have completely healed. One should bear in mind, however, the possibility of recrudescence of infection in cases in which there are no obvious signs, particularly in those wounds complicated by fracture. In these it is occasionally found at operation that a small bit of bone lies loose in scar tissue, and is surrounded by a drop of mucopurulent fluid. In view of the pathological findings in the majority of cases, it does not seem justifiable to delay operations three, six, or eight months to see if the nerve will not unite unassisted. Exploratory operations would seem justifiable in all cases in which there is no contra-indication to operation.

In cases of incomplete division, delay seems more justifiable than in complete division. But even in these, expectant treatment in the end may be disappointing, and operative interference imperative.

When the nerve is freed and the scar tissue removed, there may remain a gap of several centimetres or more. Several expedients are open. First, **Tubulization,** using hardened arteries or Cargile

membrane and threading the nerve ends together. The other alternatives are either **Transplantation,** using the radial nerve or saphenous nerve; or should this not be possible, one may do **Nerve Transference,** which, in suitable cases and positions in relation to adjacent nerves, seems to be the operation of choice. In certain cases, if at the point selected in the nerve to be used the fibres are mainly sensory, double transference should be done: that is, the proximal as well as the distal ends of the severed nerve should be joined to the nerve trunk to which transference is to be done. The nerve trunk thus acts as a scaffolding along which new motor fibres may grow to join the distal end of the severed nerve without re-education of other and new nerve centres.

Two methods should be condemned, namely, nerve-stretching, and suturing with the limb markedly flexed, which in reality becomes suturing under tension. Warrington has shown that nerve-stretching causes karyolysis of the nerve cell in the anterior horn, and subsequent degeneration of the cell axon; one thus establishes degeneration in the proximal portion of the nerve, which is surely most undesirable. When the nerve is sutured with the limb flexed, there is usually some tension. Later, when the limb is slowly straightened, the scar of union of the two ends becomes slowly and gradually stretched, so that, in place of a linear scar, a fusiform elongated one occurs, which again in turn becomes hardened, with an increase of scar tissue and the aim of the operation annulled.

The temptation to excise all hardened tissues about the nerve may lead one into greater difficulties and prolong convalescence. We know that nerve fibres will grow through considerable tissue resistance. If this be borne in mind, and in place of free excision, in suitable cases, the nerve be freed and wrapped with a flap of fat or other suitable tissue, recovery is more rapid and more complete.

Both before and after operation, the greatest emphasis must be laid on efficient and adequate treatment to prevent contractures and overstretching of the muscle groups whose nerve supply has been cut off. The principle of splinting in nerve cases is to prevent contractures and overstretching of the muscles, for we know that such muscles when overstretched undergo more rapid degeneration. Most valuable adjutants to proper splinting are constant and regular massage, hot and cold contrast baths, and the galvanic current. These must be systematically done.

Accurate determination of sensory changes, and the careful subsequent re-examination of the sensory findings, give more valuable information than the muscular reactions, both as to the extent of the injury and the rate of recovery. Careful charts should be kept, and due attention paid to the contraction of the borders of sensory loss. Shrinkage of these, more especially of the border of loss to the sense of pin-prick, is of the greatest value and interest.

The division of sensation into epicritic, protopathic, and deep has been useful, and productive of great advances in the study of nerve

lesions. From a clinical standpoint, however, the terms epicritic and protopathic are often misleading. They are supposed to be comprehensive and to represent certain forms of sensory loss. Stookey has therefore abandoned their use, and employs instead such specific terms as cotton-wool area, pin-prick area, areas of loss to moderate and extreme degrees, etc.

J. Renfrew White[2] discusses the operative treatment of gunshot wounds of peripheral nerves. The subject may be grouped under the following heads: (1) How soon after the reception of the nerve injury should an operation be performed? (2) What are the indications for operation as derived from the study of the signs and symptoms? (3) Points of difficulty and doubt as regards correct or best procedure and technique arising during the actual operation.

1. *Time of Operation.*—All wounds caused by the present-day projectiles, even those produced by rifle and machine-gun bullets that enter and emerge through tiny skin punctures, must be regarded as infected. The complication of a nerve injury by sepsis, or the involvement of a nerve trunk in a septic inflammatory process, appears to be fatal to proper regeneration, owing to the excessive production of scar tissue by the infective inflammatory process. Any operation on an injured nerve will only spread the infection up and down—up to what is normal and healthy nerve, and down to what is healthy though degenerated. Hence it becomes axiomatic that no operation should be performed on the nerve for the relief of paralysis, etc., in the presence of micro-organisms in the tissues. Even where the divided nerve presents itself in an open wound, or is found during the course of an operation with other objectives, steps taken to do more than suture the ends temporarily to prevent further retraction, or remove any foreign body or piece of bone, etc., actually pressing on the nerve, are contra-indicated and unjustifiable.

It is well recognized that the mere healing of a wound gives no very dependable assurance, at any rate for some time, that micro-organisms are not latent in the tissues; especially is this true as regards the healing, which is often temporary, of sinuses due to the presence of foreign bodies or to caries and necrosis of bone. On the other hand, it is generally admitted that secondary suture of nerves should be carried out as soon as possible.

2. *Indications for Operation.*—Clinically, complete division may be either anatomical or physiological. This, however, is a difference that in the majority of cases is not diagnosable before operation. If it be unknown whether the lesion be anatomical or physiological, operation should not be delayed. If it be known that the lesion is physiological, operation should not be delayed beyond the periods of healing and probation, if during those periods the signs have not regressed to clinical incompleteness.

Incomplete division may require operative interference for one or more of the following causes:—

a. Where an incomplete lesion remains stationary after the wound

has healed soundly and the disability remaining is serious or severe. Here, again, it would seem to be advisable to operate as early as possible, for fear the lesion, incomplete though it be, is one in which there can be no chance of spontaneous regression and recovery.

b. Where an incomplete lesion is increasing in the severity of its clinical signs, and the disability is serious or becoming so.

c. Where, after a nerve has recovered up to a certain point, some serious disability remains, either paralysis of important muscles, or extensive protopathic loss in the foot or hand, or extensive epicritic loss in the hand of a skilled manual worker.

d. Because of persistent pain—for example, in causalgia; or for persistent hyperæsthesia or hyperalgesia.

e. In all these cases operation is all the more indicated, as it is impossible to foretell the pathological condition present; it may be combined anatomical and physiological division, or severe fibrosis of a portion of the cross-section of a nerve.

3. *Procedure at Operation.*—The chief objects to be aimed at in order to ensure an operation resulting in as complete a regeneration as possible—complete functional recovery depending as much on post-operative treatment as on operative—may be summed up as follows :—

a. Where the division is physiological, by the removal of such agents—for example, scar tissue—as are preventing physiological connection or regeneration of fibres.

b. Where the division is anatomical, by the procuring of sound physiological connection between the two ends.

c. Where the length of hopelessly damaged or destroyed nerve trunk is great, possibly by the procuring of physiological connection between the degenerated paths of the distal end and the normal fibres of some neighbouring or conveniently situated nerve.

d. The protection of the suture line from fibrous ingrowth, and of the exposed length of the nerve from being surrounded by a further permanent mass of contracted or adherent scar tissue. This includes, of course, the observance of the most rigorous asepsis during the operation, and requires healing of the operation wound by first intention; also hæmostasis as absolute as possible before closing the wound, as a collection of blood-clot round or near the nerve not only constitutes an invitation to sepsis, but is destined to become organized into fibrous tissue.

e. No further damage should be inflicted on the nerve by rough handling. It is necessary, or at least very desirable, to excise bulbous ends, unless the spindles are slight; for such ends are commonly in a condition of severe interstitial neuritis, and their fibres, even of the proximal end, 'compressed from within,' are degenerated, if not in many cases actually destroyed beyond hope of regeneration. It should be made a rule, then, as regards the proximal end, to pare it with a sharp scalpel until the fibres appear in white and definite bundles with no abnormal amount of cellular tissues between. When

there is a spindle on the distal end, it too, if at all marked, should be excised ; in all cases this end should be cut until the bundles show definitely, consisting of degenerated fibres—which bundles are always more swollen and transparent than are normal undegenerated ones, and of a curious bluish-grey 'glassy' appearance. Of course the resection should be as conservative as is possible and as is consistent with the getting ground for a good physiological connection between the fibres of the two ends ; at the same time, if not performed boldly enough—scar tissue or part of a partially or completely fibrous spindle being left at either end—the chance of the occurrence of regeneration will be slight, if not altogether destroyed.

It is best to stretch a nerve to the maximum amount probably needed or desirable before the removal of the spindles ; not only does the spindle give one a good hold of the nerve for this process, but any bruising or damage sustained by it during the stretching is immaterial because of its subsequent resection. Where the division is physiological, and the pathological condition one of interstitial fibrosis, the nerve being swollen or spindle-shaped in the affected area, the best chance will be given if the nerve is first stretched and the spindle excised until the upper cut end shows normal and the lower a degenerated but otherwise normal cross-section.

One of the greatest problems, as it is one of the greatest practical difficulties in present-day operative work on damaged nerves, arises when, after stretching to the maximum amount possible or desirable, and resection of the requisite amount of the nerve trunk or ends, it is not found possible to get the cut ends to meet, much less to procure accurate and close apposition of the cut surfaces.

Where the distance that remains to be bridged over is short, such possibly successful devices as the following should be tried :—

(*a*) Such adjustment and fixation of the segment of the limb or of the part the seat of operation as will relax as far as possible the soft tissues in the tension of the nerve itself. (*b*) Sometimes a shorter artificial path can be made through or between or over muscles. (*c*) When these do not suffice to bring the ends together, and but a very short distance still separates them, the strands of fine catgut of the suture may be trusted to act as conductors for the new fibres, especially if a tube of some animal membrane be carefully wrapped around both the nerve ends and the strands uniting them.

If, however, the gap be at all considerable, then one has to resort to either *nerve transplantation* or *nerve anastomosis*. The relative merits and demerits of these two procedures have as yet not been determined with any degree of certainty.

The necessity for the use of some wrapping material for the prevention of fibrous ingrowth is still *sub judice*. On theoretical grounds, at any rate, it seems desirable. The substances most frequently used for wrapping are Cargile membrane, hardened arterial tubes, segments of the internal saphenous or other large vein, and pieces of fascia lata and adipose tissue. Some French surgeons, however, have recently

been painting the nerves with sterilized olive oil in order to prevent fibrous ingrowth and the formation of dangerous adhesions.

In hopeless cases, or where motor recovery has not occurred, such operations as *muscle transplantation*, *arthrodesis*, and *insertion of artificial silk ligaments*, which have a recognized place in the treatment of infantile paralysis, may be performed with great advantage to the patient.

The author also gives an analysis of 50 cases of peripheral nerve injury, with a description of the clinical symptoms, distribution, and character of the sensory disturbances and the operative findings. The relative frequency of injury of the different peripheral nerves in the series was as follows :—

	Times injured	Per cent
Ulnar nerve	16	24·6
Musculospiral nerve and branches	11	17
Great sciatic nerve and branches	11	17
Median nerve	7	10·8
Brachial plexus	7	10·8
Internal cutaneous nerve	6	9·2
Musculocutaneous nerve (arm)	3	4·6
Cauda equina	2	3
Spinal accessory nerve	1	1·5
Cervical plexus (great auricular and small occipital nerves)	1	1·5

Among the clinical symptoms pointing to the existence of an incomplete lesion of the nerve trunk are : (*a*) Loss of epicritic sensibility. In the cases of least severity, this area falls short of that characteristic of a complete lesion. The slightest degree of its loss is manifested by inability to distinguish the number of points of a compass, and to localize a point stimulated by light touch. (*b*) Loss of protopathic sensibility. This is a further stage along the road to completeness. Here again—but to a less extent, for protopathic loss is far more variable even in complete division in different cases of the same nerve lesion—the extent of the area of its loss is proportional to the degree of completeness. (*c*) Loss of motor power. This may vary from mere weakness of some of the muscles, to complete loss of voluntary power of a group, or of all of the muscles exclusively supplied by the nerve. (*d*) Loss of response to faradism. In some or all of the above-mentioned muscles this occurs. It is not, however, an invariable rule that a muscle which fails to respond to faradism fails of voluntary contraction.

Other signs which are characteristic of incomplete division, and in most cases pathognomonic of it, are : (*a*) The presence of sweating —often excessive—over the area of exclusive cutaneous supply. (*b*) The presence of shooting pains and paræsthesiæ referred to the area of supply of the nerve distal to the lesion. On the other hand, the eliciting of pains or paræsthesiæ referred distalwards, by pressure over the seat of nerve injury, does not necessarily mean an incom-

plete lesion, as these are often due to pressure over a part of the nerve just proximal to the lesion, which is the seat of an interstitial neuritis, and in such a case are analogous to those occurring on pressure over an amputation neuroma. (*c*) Tenderness of the nerve trunk below the lesion, or the production of paræsthesiæ by pressure on the nerve below the lesion. (*d*) Certain trophic changes in the skin glossiness, redness, and blisters; of course the last are not by any means pathognomonic of incompleteness. (*e*) Hyperalgesia of the skin exclusively supplied, without protopathic loss. (*f*) A patient with an incomplete division which is causing much pain frequently gets into a very emotional and hysterical condition, and he will become very antagonistic at the suggestion of another sensory examination. (*g*) The nature of the galvanic response: Sherren has described a reaction of incomplete degeneration which sometimes occurs with an incomplete lesion. The paralyzed muscle will respond by contraction to a smaller current than on the opposite side; usually the polar reversal is absent. The diagnostic value of an absent reaction is slight.

Alwyn Smith[3] emphasizes the point that surgery must go hand in hand with massage, electrical, and postural treatment in nerve-suture cases. Any institution where nerve surgery is performed must be adequate to deal with the case in all these particulars.

All cases of complete lesion should be sutured as soon as they are diagnosed, provided they are fit for operation. Cases due to bullet wounds that have healed rapidly may safely be operated upon within three weeks from the time the wound is healed. Wounds due to shrapnel or high-explosive shell require a longer period, especially when there has been bone involvement, destruction of tissue, with consequent scar-formation, or when fine metallic bodies are present. Undue haste may be followed by sepsis on account of the latent infectivity that remains for a long period in this type of wound.

Postural Treatment.—The paralyzed muscle groups must never be allowed to become overstretched by their opponents, or contractures will occur. The overstretching of a paralyzed muscle, devoid of tonicity, if allowed to persist, may render the muscle incapable of contraction even after nerve conductivity is re-established. In lesions of the musculospiral nerve the wrist and fingers should be kept hyperextended; lesions of the sciatic and popliteals require the foot to be kept at a right angle. Under no consideration, however, must undue stretching of the paralyzed muscles be permitted at any time.

Operative Procedure.—It is advisable in all arm cases to use a side table, so that the arm may be abducted to a right-angle and remain steady in that position. Where there is marked scar-tissue formation, it is advisable to make the incision in the line of the nerve above and below the scar, and to pick the nerve up at the upper and lower level where it lies in its true anatomical relationship with surrounding structures.

These nerves are often destroyed for a distance of one to three inches, so that large dissections are required above and below the site of injury sufficient to give end-to-end apposition. Whenever this can

be obtained by any means, nothing should be left undone to bring it about. In large gaps, where other means have failed to get end-to-end apposition, the gap should be joined by chromic catgut sutures, and the whole covered in by a fascial 'sleeve.'

The amount of shortage in the nerve can be overcome in four ways: (1) By flexion of intermediate joints; (2) By free dissection of the nerve for a considerable distance above and below the lesion; (3) By translation of the nerve path to a straight line; and (4) By dislocation of the nerve.

In suturing the nerve, a temporary stitch of fine catgut is placed through the nerve ends with a fine non-cutting needle at a distance of about half an inch from each extremity. This stitch aids the surgeon in the permanent suture. The nerve is sutured by means of the finest domestic sewing needle and the finest white sewing silk obtainable. A continuous stitch is put round the nerve, involving nothing but its sheath. The catgut 'stay' stitch is now removed, and the whole circumference of the suture examined. An autogenous graft of fascia lata is then removed from the thigh. The outer side of the thigh about its centre is opened by means of a semicircular incision involving the skin and subcutaneous fat. This flap is turned down and the fascia lata is seen. A parallelogram of fascia is removed, varying in size with the calibre of the nerve it is desirous to cover. It is well to err on the large side, as the fascia tends to contract on separation, and the 'sleeve' must be easy fitting.

All cases of complete nerve lesion do not show the bulbous ends previously described. After dissection, the nerve sometimes appears normal to the eye. On palpation, the fibrous block is generally recognizable, as it feels harder than normal nerve. Should faradic stimuli fail to pierce the block, it is advisable to divide the nerve at its hardest point, and then to section each end until healthy nerve is reached.

After-treatment.—The author emphasizes the fact that peripheral-nerve lesions require prolonged after-treatment. This should be given in institutions suitable to the purpose, at which the soldiers can attend as out-patients. The institution should be equipped with complete therapeutical apparatus, and also with curative workshops. These workshops are used for functional re-education.

War Injuries to the Musculospiral Nerve.—W. B. Warrington[1] reviews his experiences, and advocates the following treatment.

In cases in which there is complete loss of function, the hand and fingers should be supported for three months on a light cocked-up splint, the muscles being massaged daily and passive movements of the joints carried out. The muscles should also be stimulated by the galvanic current.

If recovery in any muscles, even though very slight, can then be discerned, this treatment should be continued, and further, the patient encouraged to attempt voluntary movement; for it is important to remember that the stimulus of voluntary movement is far more potent than that provided by passive movement.

If, on the other hand, there is no recovery, the nerve should be

explored. The surgeon should have clearly in his mind the conditions he is likely to meet with, and have determined as far as possible beforehand the procedure to be adopted. From the neurological standpoint, any traction on the proximal end is most undesirable, since this will certainly cause retrograde changes in the anterior cornual cells. After operation, postural fixation, massage, and passive movements are still urgently required.

If, at the end of six to eight months from the date of operation on the nerve, not even the slightest voluntary movement is discernible, then we think the propriety of tendon transplantation should receive careful consideration.

If, when the nerve is first examined, eight months or more have elapsed since the date of injury, and complete loss of function is found, then the prognosis as regards recovery is doubtful. The muscles give either no reaction or a very feeble contraction to galvanism, and it is not unlikely that the anterior cornual cells themselves have undergone retrograde changes. Tendon transplantation should again be considered.

Gerster and Cunningham[5] review the literature bearing upon the interesting question of the direct *neurotization of paralyzed muscles by the implantation of motor nerves*, and report their own experimental studies in this field. The first observation was made by Gersuny in 1906, who observed, after removal of a tumour of the face, that a facial muscle which had been severed from all connections with the facial nerve recovered its motor function if replaced in such a way that it lay in immediate contact with normally innervated muscle. Subsequently it was demonstrated by other investigators that direct implantation of the motor nerve into the muscle produced similar results. This important question is still in the experimental stage, although some apparently good results have been obtained in actual practice. Its importance in those cases of paralysis in which the usual methods of nerve suture are not applicable is obvious. From their experimental work, the authors concluded that a recently paralyzed muscle can be innervated by implantation of a motor nerve. This may be the identical nerve which originally supplied the paralyzed muscle, *or some other motor nerve*.

Alteration in the movement of *prehension of the thumb* has been studied by P Descoust[6] in cases of ulnar paralysis, median paralysis, and associated palsies of these two nerves. If a piece of paper is grasped between the index finger and the thumb of each hand, and traction is then made, a definite and characteristic position of the thumb is assumed, dependent on the synergic activity of the adductor of the thumb, innervated by the ulnar nerve, and the flexors, innervated by the median. Froment pointed out a characteristic flexion of the distal phalanx of the thumb during this manœuvre in ulnar palsy due to paralysis of function of the adductor. Descoust indicates a characteristic attitude after median paralysis—namely, a tendency to inversion of the thumb due to loss of the action of the flexors. In combined lesions neither Froment's nor Descoust's sign

is present, and there is a total inability to carry out the act of prehension.

The author believes these two signs to be of diagnostic value, as well as of prognostic import, as they appear early and are among the last to disappear. If the palsy is unequally distributed between the ulnar and median nerves, the difference is indicated by a tendency to flexion of the distal phalanx of the thumb (ulnar), or to inversion (median).

The Lewis Jones condenser, an apparatus devised by the late Lewis Jones for making electrical tests of nerves and muscles, has been used by many observers during the present war, and apparently possesses many advantages over other instruments for making electrical tests. *The technique of condenser testing in nerve injuries* is described in some detail by Hernaman-Johnson.[7] In the first models the condensers were charged and discharged by means of a metronome, make and break being effected by silver rods dipping into mercury cups. This arrangement permitted only of 'single-twitch' methods; a tetanizing current could not be produced. In the modified instrument, charge and discharge is effected by a motor-driven break, which consists of two vulcanite discs having copper sectors, against which carbon brushes are pressed. Double discs are used, so that the patient's circuit is earth-free, which was not the case in the early instruments. Any number of impulses between one and thirty can be delivered per second.

Testing of Muscles.—When testing muscles, it is usually desirable to use the 'single-twitch' method. *The rate of discharge should not exceed one per second.* otherwise the nature of the response becomes affected. The method of testing hitherto followed has been to set the voltmeter at 100 volts, and to note what length of impulse, or size of condenser, was needed to provoke a just noticeable muscular contraction. A response only to impulses lasting $\frac{1}{400}$ to $\frac{1}{200}$ second indicates either that there is, *or has been in the more or less recent past*, a complete blockage of all motor impulses.

The 'voltage-duration test': In the case of a muscle whose nerve is definitely known to be severed, a doubling of voltage will enable a condenser of 50 per cent less capacity to be used; but any reduction of capacity—or impulse-duration—beyond this results in a failure to provoke contraction. Thus, a contraction provoked by a condenser of 2 microfarads (No. 12, L.J. scale) at 100 volts may be reproduced by one of 1 microfarad at 200 volts; but 0·5 microfarad at 200 volts gives no result. In a recovering lesion, however, although anything less than 2 microfarads at 100 volts may fail, *yet at* 200 *volts*, 0·5, *or even* 0·25, *may produce a good response*. Stated a little differently, if a raising of voltage from 100 to 200 volts enables the total energy—i.e., product of capacity × voltage—required to produce a contraction to be reduced by 50 to 75 per cent, it may be taken that the muscle is not entirely cut off from motor impulses. This reaction is characteristic of partial blockage, or of a stage in the recovery from complete blockage. The modified apparatus is now provided with a switch which enables the current to be changed from 100 to 200

volts. Studs Nos. 12, 11, 9, 7, 6 afford capacities, or impulse durations, each of which is half the one immediately preceding, so that it becomes a very simple matter to test for the reaction above described.

The Testing of Nerves.—The above remarks have reference, so far, exclusively to the use of single impulses delivered at a rate not exceeding one per second. This is the method most suitable for testing muscles. When nerves are to be stimulated, a rapid succession of impulses—not less than fifteen or more than twenty-five per second—is desirable. A milliampèremeter should always be in circuit with the patient. It need hardly be said that when a nerve is surgically blocked, no amount of stimulation applied to its trunk will cause contraction in the muscles which it supplied. But, short of such blockage, there are all degrees of interference with conductile capacity. It is for the measurement of these that it is so necessary to have a standardized tetanizing current, as well as standardized single impulses for the stimulation of muscles. By careful records we are able to say whether the nerve is gaining or losing in conductivity.

It is highly desirable that, wherever possible, condensers should be used in the testing of nerve-muscle injuries, and that the set of 'capacities' introduced by the late Dr. Lewis Jones should be adhered to. The ideal aimed at in making a report should be to enable any observer possessing the necessary instrument to reproduce as nearly as possible conditions under which the test was originally made. (*See also* p. 58.)

References.—[1]*Surg. Gyn. and Obst.* 1916, Dec., 639; [2]*Brit. Med. Jour.* 1917, i, 388, and *Brit. Jour. Surg.* 1917, April, 607; [3]*Brit. Med. Jour.* 1917, i, 861; [4]*Liverpool Med.-Chir. Jour.* 1916, 51; [5]*Med. Rec.* 1917, ii, 223; [6]*Presse Méd.* 1917, Feb., 93; [7]*Lancet*, 1917, ii, 117.

NERVES, TUMOURS OF. *J. Ramsay Hunt, M.D.*

Tumours of the peripheral nerves occur either as solitary or diffusely multiple lesions. Though they are not uncommon, and have been the subject of much discussion in medical literature, chief attention has been paid to the one great division of the nerve tumours which are a feature of the disorder known as von Recklinghausen's disease. There occurs, however, a group of cases with multiple nerve tumours which appear to be sharply differentiated from von Recklinghausen's disease. Among these tumours are the 'painful subcutaneous tubercles,' sarcomata, and all the circumscribed tumour formations to which the framework of the nerve can give origin. The point of distinction that is most emphasized between these and von Recklinghausen's disease is that they are circumscribed, and occur in the course of an otherwise normal nerve. They are not encountered so frequently as the generalized form, and even though the tumours may be multiple, they are regarded as distinct from generalized neurofibromatosis.

As is true of the connective tissue elsewhere, the framework of nerves can give rise to both innocent and malignant tumours. Spon-

taneous malignancy, however, is rare, and as a rule sarcomata of nerves are due to innocent tumours which have undergone malignant change. The usual varieties of connective-tissue tumours are found: fibroma, myxoma, lipoma, and combinations of these, including those undergoing cystic degeneration and containing hæmorrhages. Generally speaking, they are of slow growth, and though they may occur at any age, they are far more frequent during the third and fourth decade. They attack any nerve. Their most marked clinical feature, aside from the tumour, is the liability to extreme sensitiveness. Many writers consider injury as a definite etiological factor.

Fleming and Marvin[1] describe three interesting cases of false neuromata—fibromyomata—with familial incidence. There was a history of local trauma in two of the cases. Such a familial tendency of the discrete false neuromata has not been heretofore observed. It is true that the so-called plexiform neuromata are occasionally hereditary, but these lesions are congenital as well, and closely allied to the disorder known as generalized neurofibromatosis, and the cases under consideration probably do not belong to the von Recklinghausen group. It would appear, moreover, that the tendency among the members of this family to these isolated tumours bears a definite relation to trauma. At least, in two cases the fact that a direct injury of unusual severity, occurring in the same situation, was followed in each instance by a sciatic tumour, would seem to be more than a coincidence.

In regard to treatment of these myxofibromata of the nerve sheaths, early **Excision** is curative. They rarely, if ever, recur if completely enucleated before they have undergone malignant change. When sarcomatous degeneration has taken place, recurrence is the rule after an attempted enucleation.

Reference.—[1]*Surg. Gyn. and Obst.* 1917, March, 287.

NERVOUS SYSTEM, SYPHILIS OF. (*See* Syphilis of the Nervous System.)

NEURALGIA AND NEURITIS. *J. Ramsay Hunt, M.D.*

Trifacial Neuralgia.—E. H. Beckman[1] records some interesting observations on the diagnosis and treatment of trifacial neuralgia, based on the results of treatment in 177 cases.

Diagnosis.—A great many cases in which there is pain about the head and face due to sinus disease, affections of the nose, and infection about the teeth or jaw, are confused by many practitioners with facial neuralgia, and referred to the surgeons or neurologists as such. All cases of this nature have been excluded from this series.

The term tic douloureux is a misnomer, since there is no true spasm of the muscle associated with the pain. The pain is always severe, and comes in a short, sharp attack, like a shock of electricity. If the attack continues for a half-minute or longer, it will be found on close questioning that the pain is not continuous, but made up of a series of short, severe attacks, interrupted by brief intervals. The pain is

very often started by the slightest irritation of a certain localized area on the face or tongue, occasionally by the irritation of a single tooth. These areas have been described by Patrick as 'doloro-genetic zones' or 'trigger zones,' since the slightest irritation of one of them is comparable to the lightest touch on the hairtrigger of a gun, and explosive pain follows the irritation immediately.

Infection about the teeth and face is a very usual history, but since these are common to all persons, it is questionable whether they have any real bearing on this disease. It is quite possible that later investigations will show that trifacial neuralgia is an infection of the nerve branches, which progresses to the Gasserian ganglion. At any rate, a great many patients who have had pain in a single peripheral branch have later returned with pain in another division or in all three divisions. Examination of six ganglia from trifacial neuralgia cases by Wilson showed marked inflammation in all. Contrary to the usual conception, he does not believe that arteriosclerosis plays any rôle in this disease.

Treatment.—The treatment of trifacial neuralgia is essentially surgical. Medical treatment is confined to hygienic measures, and seems to have but slight influence in the majority of cases.

Excision or Evulsion of the Peripheral Nerve Branches.—An excision or evulsion of the peripheral nerve branches was done in 19 cases; 3 were supra-orbital, 9 infra-orbital, 5 inferior dental, and 1 lingual. The longest period of relief in any of the series was two years. None of the patients treated by excision or evulsion of the peripheral branches had any complications following treatment, and there has been no death. The method of Kanavel for blocking the foramina seems to be the most rational that has been proposed. (*See* Medical Annual, 1916, p. 416.)

Injecting Alcohol into the Main Nerve Branches at the Base of the Skull.—There were treated in this way a total of 146 patients. The plan was followed of injecting the second and third divisions when one of them was affected. Occasionally some bleeding resulted, which produced considerable tension underneath the temporal fascia. In three patients there was inflammatory reaction of the cornea, which cleared up within a few days; in two there was temporary paralysis of the external rectus muscle of the eye: and in six, stiffness of the muscles of mastication, which gradually subsided. The last were patients who had had several injections. The length of time patients were relieved varied greatly, in one instance the relief lasting as long as five and a half years, in another three years, and in another three and a half years. This would seem to be very favourable. Only 30 were relieved for one year or longer. The average length of time for the entire series of 120 from whom answers were received, was 9·4 months, a slightly longer average than the time of relief following the series of operations on the peripheral branches. A discouraging feature of this method of treatment is that 77 of the 120 (64 per cent) had relief of pain for six months or

less. There was no mortality in this series, and there were no serious complications.

Operation on the Gasserian Ganglion.—This was done in 18 cases: 13 of these patients had had some type of peripheral operation, and 2 had had previous operations on the Gasserian ganglion, while all had had deep injections of osmic acid or alcohol into the various nerve branches for the relief of their suffering. In 9 of these, all three divisions were involved; in 6 there was involvement of the second and third divisions; in 2, involvement of the first and second; and in 1, involvement of the first and third. In 11 patients the ganglion was removed by the Hartley-Krause method, 1 was operated on by the method of Abbe, and 6 by the method of Frazier. Of the 16 living patients, 13 have been completely relieved of their pain, or the recurrences have been so slight that they consider their condition satisfactory. The remaining 3 of this group had recurrence; 2 of these were operated on by the Hartley-Krause method, and 1 by evulsion of the posterior nerve root. These recurrences were considered to be due to the failure to remove either the entire ganglion or all of the fibres of the posterior root.

There were 2 operative deaths in this series. This mortality is much too high. The operation, however, is serious, and must not be undertaken too lightly, and only by surgeons who have had considerable experience in surgery of the brain. At present evulsing the posterior nerve root or removing the ganglion entirely is the only operation insuring permanent relief, and the mortality is no higher than that of many serious operations performed daily by surgeons throughout the country.

Diathermia, or thermopenetration, the use of which is recommended by H. F. Wolf,[2] is a method which consists in heating the tissues by means of the high-frequency current. The ordinary high-frequency current cannot be used properly for this purpose, on account of the high-tension and the irritation produced by the sparking. The electrodes are applied in such a way that the affected ganglion shall be located between the two. The best method is to apply one at the back of the neck, near the base of the skull, and the other over the eye, which is first covered with a thick layer of cotton saturated with salt solution, or on the upper jaw. One seldom uses more than 1000 ma., and generally only 700. The duration of each treatment is from thirty minutes to one hour. It is a very valuable agent in the management of trifacial neuralgia, and it should always be tried before less conservative treatments, such as alcohol injections or section of the nerves or the ganglion, are resorted to.

Meralgia Paræsthetica.—This is a neuralgic or neuritic affection of the external cutaneous nerves, and is a rather rare occurrence in civil practice. W. J. Rutherford[3] describes five cases occurring in soldiers. The condition is important from a military point of view, as it is capable of giving rise to disability of longer or shorter duration, and may be recurrent.

The condition occurs in both sexes, and both nerves may be

affected ; but more commonly one limb alone is involved. As the external cutaneous nerve is purely sensory, the symptomatology is unattended by motor disturbance. Sensation is lost over the area of distribution of the affected nerve, for slight touch, for perception of points, for heat and cold, and to a certain extent for pain, while deep pressure can be perceived. A touch on the bare skin is felt as though a layer of clothing intervened, or as one might feel a touch on the back of a gloved hand. In long-standing cases a distinct cutaneous thickening may be made out if a fold of skin is pinched up between the finger and thumb, and the skin of the affected area (in some cases at least) may show some atrophy of the hair follicles. With this, or as the result of the local analgesia, the phenomenon of the cutis anserina is lost ; and if the patient is examined in a cold room, there is no goose-skin on an area in the upper and outer aspect of the thigh, even though the other parts show distinctly an erection of the hairs.

Not only is there anæsthesia, but perverted sensations are present in the affected area. These are variously described, and take the form of shooting pains, of a sensation as though an invisible hand had grasped the thigh and were screwing round a handful of the flesh, and of a sensation as though scalding water were pouring down the outside of the limb. These sensations are usually of short duration, and of variable onset ; they may not occur for months on end, or even for years in old-standing cases, but are liable to recur again and again on little or no provocation. Their onset may be ascribed to changes in the weather, to damp and cold combined, to going out into the cold frosty night air from a warm billet, or to exercise, especially moving at the double. The pains may be nothing more than a mere tingling, or they may be so severe as absolutely to incapacitate the patient for the time being : and it is this possibility of the occurrence of sudden attacks of absolutely incapacitating pain that makes the condition of importance from the point of view of military surgery.

The etiology of the condition seems to be unknown.

It may be possible to relieve the condition by **Surgical Treatment** — cutting down on the nerve, tracing it to its point of emergence through the fascia of the thigh, and either stitching back or excising a flap.

References.—[1]*Ann. Surg.* 1916, 242 ; [2]*Med. Rec.* 1916, 1152 ; [3]*Brit. Med. Jour.* 1916, 583.

NEURALGIA, BRACHIAL AND DELTOID.

Herbert French, M.D., F.R.C.P.

A new habit ailment has recently been described[1] which affects those addicted to reading in bed. A common custom among these individuals is to support the head with the right hand, while the left holds the book. In cold weather the right shoulder and left arm are thereby uncovered and exposed. After a certain interval the reader may complain of pains in these two localities which suggest neuralgia or rheumatism. Besner[2] describes the pains at length. They are

more or less intense, and interfere with the movements, and are felt along the course of the brachial plexus, suprascapular triangle, and insertions of the scapulohumeral muscles, especially the deltoid (lower insertion). Pains are also felt along the nerves of the arm, especially opposite the articulations. Two tender points occur: one neuralgic, the other peri-articular. In some cases muscular atrophy results. The affection closely resembles inflammation about the shoulder-joint. The disability is of the same character; the deltoid suffers in both, and there is in both a tender point beneath the coracoid process. In bed-readers' shoulder, however, there is a tender point over the brachial plexus and at the inferior insertion of the deltoid. When a reader renounces his habit the pains cease, but many will not give up reading, and content themselves with attempts to relieve the pain. One subject obtained relief by protecting his shoulder from exposure.

References.—[1]*Med. Rec.* 1917, i, 598; [2]*Jour. de Méd. et de Chir. Prat.* 1917, Jan. 10.

NEURASTHENIA. (*See also* Shell Shock.) *J. Ramsay Hunt, M.D.*

There is perhaps no more important group of cases encountered in the practice of medicine than that included under the general term of neurasthenia. They confront the surgeon, the specialist, and the general practitioner, are very generally misunderstood, and furnish the material upon which numerous pseudo-medical cults and fake cures are founded. It has been found that the excessive stress and strain of war has been a particularly potent factor in the production of neurasthenic states, and any contributions to the treatment of this malady at the present time are particularly welcome.

Austen Riggs,[1] of Stockbridge, Massachusetts, in reviewing the previous treatment received by his patients, found that prolonged rest had done them more harm than good. Those who had had an exercise cure were in much better condition, both physically and mentally, and the result of therapy finally brought about the absolute conviction that *neurasthenia is a mental disorder*, and that it should be attacked primarily as such.

It seems inevitable, then, that the real cause must reside in some mental peculiarity common to all these patients. He believes that in some cases this peculiarity is directly inherited, and that in most cases a perfectly normal individual acquires it very early in life by direct contagion from neurasthenic parents or relatives or attendants. In still others, and more rarely, it may be produced later in life by a normal individual reacting to extremely abnormal physical or mental strains. To this last type belong the cases rightly called *secondary neurasthenia*.

The mental peculiarity is in part a sort of 'tenderness' (William James). It is characterized by an abnormal mental sensitiveness to the quality of feelings. Pleasantness and unpleasantness, especially unpleasantness, is too important. Therefore sensations acquire an abnormally high emotional value, and also, through mal-interpretation, a false significance, and both they, and likewise the emotions

themselves, become, one might say, chronically and exaggeratedly accentuated. The neurasthenic's world becomes divided into affective categories—things and people that are unpleasant, and things and people that are pleasant; things which do him good, and things which do him harm; things which require effort, things which do not; and that commonest of all symptoms, 'fatigue,' is really only a heightened consciousness of bodily sensations, concentrated and coloured by apprehension.

The condition calls for psychotherapy primarily, and for physical means only secondarily, and then only to combat the physical by-products—whatever they may be. Psycho-analysis, carefully and scrupulously guarded by common sense against the personal bias, the personal symbolism, and the possible sexualism of the user, is a very useful diagnostic instrument. He has found in psycho-analysis, when thus guarded, a valuable diagnostic tool, especially in that most important matter, the study of personality.

Fundamental re-education of the patient is the weapon in which he puts greatest trust. To teach the neurasthenic what neurasthenia is, to teach him to contrast this state of mind with the normal, to show him that he can attain this normality, is, he believes, 75 per cent of curing him. The other 25 per cent consists in applying this knowledge to practice. Coupled with the re-educational psychotherapy there must, of course, be rational physical treatment, based on the particular need of each patient. This part of the treatment is carried out in Stockbridge according to a definite schedule for each patient, in which exercise plays an important rôle, and includes individual calisthenics, as well as out-of-door walks, golf, skating, or snow-shoeing, while rest plays a distinctly subordinate part, and is given no physiological importance whatever.

Re-education is the method upon which he places greatest reliance. This is carried on through a series of office visits, which are never hurried, and are therefore frequently pretty long—they average an hour. Until the patient is well started on his schedule, a daily visit seems best. Then one every two or three days is sufficient. As soon as the patients have acquired a good working modicum of self-control, and their physical condition has become satisfactory, with as little warning beforehand as possible they are sent home on a trial trip, to apply their knowledge and the fruits of their practice to their own environment. The stay at home varies from two or three weeks to six months or more in length—according to the case and the environment. A return to Stockbridge for treatment usually follows the trial trip. It is in most cases short—a few days only—and usually consists in a critical review of the successes and failures in adjustment, and other experiences, brought out by the trial trip. The next home-going is apt to be permanent, but is often followed in six months or a year by a final visit of a few days in Stockbridge.

Results of Treatment.—The author gives a summary of results obtained. Of the 355 patients discharged two years ago or longer, whose records were complete at discharge, the present condition of

129 is known. The following statistics apply to this smaller number. Patients discharged—

	2 years and over = 129. Per cent.		3 years and over = 91. Per cent.	
No improvement	0·7		1	
Improved	15		11	
Much improved	36	83	30	87
Cured	47		57	

Duration of Treatment.—Average, 4 weeks (aggregate); longest, 6 weeks (aggregate); 40 per cent treated for one week or less.

Reference.—[1]*Johns Hop. Hosp. Bull.* 1916, Oct., 281.

NEUROSES OF WAR. (*See* Shell Shock.)

NEW-BORN, HÆMORRHAGIC DISEASE OF. (*See* Hæmorrhagic Disease of the New-born.)

NOSE, DISEASES OF. *J. S. Fraser, M.B., F.R.C.S.*

Nasal Deformity.—L. L. Stanley[1] remarks that in almost any fistic encounter the nose is the most accessible point of attack. As a result it may be more or less injured. In some cases the blow is insufficient to fracture the nasal process of the superior maxilla or the nasal bones, but there is force enough to dislocate the cartilage of the septum, along with the mesethmoid and vomer, so that permanent nasal obstruction results. In other cases the bones are broken and the nose is deformed. If this condition is recognized soon after the accident, and the fracture reduced, there may be no permanent deformity. Without attention, however, the result is disfigurement.

Stanley advises operation under ether anæsthesia. As soon as the patient is relaxed, the operator places against the convex side of the nose a round piece of wood, or buffer, six inches long and one inch in diameter. The end placed against the nose is heavily padded. Then, with several strokes of a mallet against this buffer, each stroke being progressively heavier, the nose is re-fractured, and is quickly set in proper position. There is usually some ecchymosis following very soon, but, by holding the nose firmly with the thumb and finger, undue swelling is prevented. As soon as the nose is in proper position, the nasal cavity is quickly packed with strips of narrow bandage, previously boiled in petrolatum. This is packed in rather tightly, and soon the bleeding from the nose is stopped. When the intranasal packing is in place, pieces of gauze, cut to fit over the nose, cheeks, and forehead, are saturated with liquid collodion and placed over the nose in layers, each one being allowed to harden by means of a current of air which evaporates the ether before the next layer is applied. In a short time the splint is dry and the nose is held in normal position. On the second day the intranasal packing is removed, and on the fifth day the collodion gauze splint is taken off. The nose is usually found to be straight and to functionate better than before, though Stanley remarks that it may be necessary to do a subsequent submucous resection of the septum. After operation there is usually a 'black eye' which persists for several days.

Lee Cohen[2] has adopted the methods introduced by Joseph for the correction of nasal deformities. He lays great stress upon the importance of proper technique. The vestibule of the nose should first be prepared by careful removal of all hairs with small scissors. The nose should then be thoroughly douched with sterile normal salt solution, after which soap and water, ether, and alcohol are used to complete the process in the vestibule. The entire face is also cleansed in the same manner, and is afterwards so draped with sterile

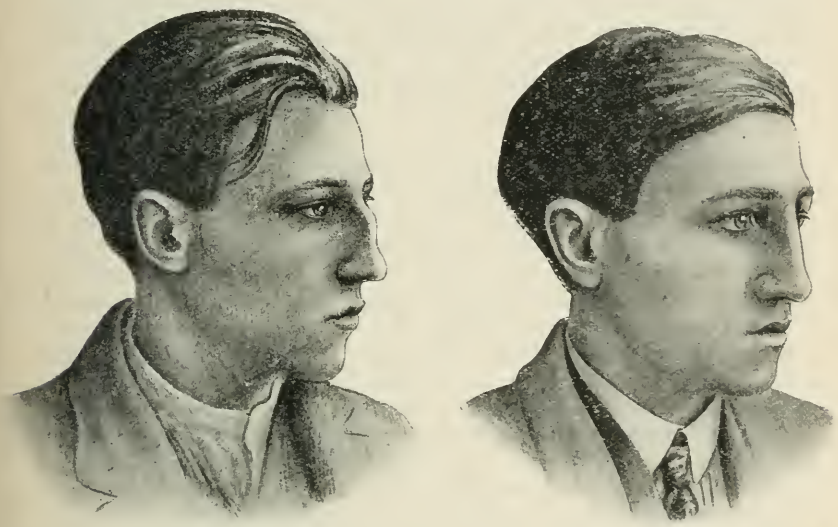


Fig. 80.—Lee Cohen's operation. Patient before and after treatment.

towels that only the nose and mouth remain exposed. The mouth is covered with gauze. The entire nose, with the exception of the vestibule, is packed with sterile gauze, and over this a pledget of cotton saturated with alcohol is placed. Local anæsthesia is usually employed. Cohen considers it of importance, in undermining the skin and in all subsequent steps of the operation, to introduce as seldom as possible the same instrument after its withdrawal from the wound. Rubber gloves should be used by the operator and his assistants.

He records a case in which under local anæsthesia the skin over the entire nose was undermined through the usual incisions, one on each side, made from the interior of the vestibule parallel with and just below the edges of the nasal bones and nasal (frontal) process of the superior maxillæ. The entire bony dorsum was now sawed through from the frontal notch down to the beginning of the cartilaginous portion. Before sawing, the periosteum was cut through along the same line with the sharp edge of a small periosteal elevator. The saw was introduced first on the left side. A fresh saw was then introduced into the right side. But slight lateral pressure was then needed completely to mobilize the bone. Pressure on the lower end of this segment removed every appearance of a hump nose.

There still remained the elongated tip and the rather low plane of the columna to be corrected. This was accomplished by the removal of a triangular piece from the lower portion of the septum, the apex of the triangle being situated at the anterior nasal spine, the base upward and forward beneath the cartilaginous dorsum of the nose, just above the fleshy tip. This was done by first transfixing the membranous septum with a small knife and cutting upward and forward to the dorsum. A similar diverging incision was made above, through the lower part of the quadrilateral cartilage, forming the upper arm of the triangle. The piece removed consisted, therefore, partly of the membranous and partly of the cartilaginous septum. The edges of the wound were brought together by four superficial sutures of black silk on each side of the septum, after which two deep mattress sutures were introduced through the cartilaginous septum above and the columna below, in order to prevent any sagging of the tip.

The vestibule was packed with iodoform gauze, and a copper splint lined with lint applied externally.

Nasal Antiseptics.—Dunham and Dakin[3] hold that it is difficult to destroy pathogenic organisms in the nasal cavities and upper air-passages by direct disinfection. Gordon and Flack have obtained good results from **Chloramine,** which does not precipitate or coagulate the secretions or exudates. Chloramine-T, however, is practically insoluble in oils, but **Dichloramine-T** is readily soluble in eucalyptol, and the resulting solution can be diluted with paraffin. The active chlorine in the antiseptic is not exhausted after two hours if a 2 per cent oily solution is sprayed into the nose. As a preliminary, the nasal cavity should be cleansed with a watery alkaline spray or irrigation, and then the oily solution of dichloramine-T should be applied by means of an atomizer designed for paraffin oil. Each nostril should receive ten to twenty vigorous compressions of the bulb. In three cases the writers have obtained sterile swabs on the morning following this treatment. They give the following directions for preparing the solution: Dissolve 0·2 grm. of the dichloramine-T in 2 c.c. of the chlorinated eucalyptol without heating. When solution is complete, add 8 c.c. of the chlorinated paraffin oil. Mix well, and the solution is ready for use. It contains 2 per cent of dichloramine-T. The solution should be discarded as soon as a distinct precipitate makes its appearance. As a rule the mixture should not be used more than three or four days after preparation (*see* p. 11).

Epistaxis.—August L. Beck[4] remarks on the strong desire to overcome the severe pain and discomfort incident to the use of gauze as a packing in the nose. He has introduced an inflatable rubber bag, trapezoidal in shape, so as to conform to the shape of the nasal interior. The two ends are reinforced by an extra thickness of rubber, so that when it is in position and inflated there is no bulging forward out of the vestibule or backward into the post-nasal space. The breadth is not sufficient to reach from the floor to the roof of the nose. It does not make contact with the upper third of the nasal interior. The inferior border is so shaped as to make accurate contact with the whole length of the floor of the nose. The anterior border lies in

the plane of the anterior bony nasal opening, and the same applies with regard to the posterior border. Three sizes are obtainable. The tubing is long enough to permit folding when it is tied. The bag, smeared with lubricating jelly, can be inserted by means of forceps or an applicator. It requires only slight distention, graduated to some degree by the patient's sensations when not under general anæsthesia. Too much pressure soon becomes painful. It is surprising how little pressure is required to stop bleeding from a small vessel (artery or vein) when the force is applied perpendicularly to the area. Sterilization is carried out by boiling in saline solution for at least three minutes just before using.

The apparatus can be used: (1) As a splint in fractures of the nasal septum when seen soon after the injury. The bag is inserted in the side toward which the displacement took place, and then it is suddenly and forcibly inflated, with the result that the septum is suddenly replaced in its former position. As this procedure is very painful, a general anæsthetic should be administered. The bag should remain in the nose from twenty-four to seventy-two hours. (2) After the submucous resection of the septum; the bag displays its great advantages over gauze—namely, ease of insertion, freedom from pain, ability to vary the pressure, the comparatively short time it is permitted to remain in the nose (six hours), ease of removal, and the comparatively slight bleeding at the time of removal. (3) For control of hæmorrhage. A frequent use for the bag will be found in cases of spontaneous epistaxis regardless of cause. The bag should be left in the nose from twelve to twenty-four hours. In cases of epistaxis in adults with high blood-pressure, the use of the bag should be governed by the blood-pressure and hæmoglobin readings.

Septal Hæmorrhage.—Leshure[5] advises: (1) Local anæsthesia by cocaine and adrenalin; (2) Incision and elevation of the septal mucoperichondrium backward for one inch, and down to the floor of the nose; (3) Compression of the elevated membrane between the blades of a special forceps or dressing forceps; (4) Replacement of the flap, and packing in the usual manner for twenty-four hours. The indications for operating are: (*a*) Septal hæmorrhage which resists ordinary treatment; (*b*) Cases in which no bleeding point can be found; (*c*) Cases of chronic crusting accompanied by bleeding; (*d*) Septal hæmorrhage in children, who are best operated upon under general anæsthesia. The bleeding points are usually low down and far forward; consequently the incision should be placed to meet this. In some cases a horizontal incision should be made along the floor of the nose, joining the lower end of the vertical incision. These two incisions sever the continuity of the vessels passing through Stenson's canal. Leshure has operated upon 41 cases.

Ozæna.—Horn and Victors[6] have treated thirty-two cases of typical clinical ozæna with **Coccobacillus Vaccine**. The initial dose was 125,000,000, and this was increased 100,000,000 every third or fourth day until some evidences of reaction were manifest. Ultimately one to

two billion organisms were administered. In many instances the effect of vaccine therapy was immediate and striking. Disappearance or lessening of odour was the most gratifying result, and was effected to a marked degree in most instances. Likewise there was a rapid reduction of the crusting. In several cases the disease was absolutely cured. The most disappointing feature of treatment lies in the *tendency to relapse* after vaccine treatment is discontinued.

The *Bacillus bronchisepticus* (organism of distemper in dogs) and the coccobacillus of ozæna are intimately related. Horn and Victors are inclined to class the ozæna coccobacillus with the colon-typhoid group, although it has certain characteristics of the hæmorrhagic septicæmia group of organisms. *Bacillus bronchisepticus* is classed with the latter group. The authors suggest that the name of *Coccobacillus fœtidus ozænæ* be changed to that of *Bacillus rhinosepticus*. They are inclined to dismiss entirely the Abel and other 'Friedländer' bacilli as etiological factors in clinical ozæna, as they believe that these organisms are merely saprophytic.

The use of **Garlic** in (p. 15).

Rhinoscleroma.—MacKee[7] considers rhinoscleroma a typical example of the group of dermatoses in which **X Rays** or **Radium** offer the best means of permanent cure. As a large total dosage of *x* rays is required, unless the disease is in its early stage, an intensive technique is indicated. Deep therapy is also called for, so that filtration is required. If the disease is limited to the alæ nasi, an unfiltered ray may be directed into the nasal orifices; two or three doses of from $\frac{3}{4}$ to 1 Holzknecht unit will usually suffice for a cure. In extensive cases it is advisable to divide the nose into several areas for the purpose of cross-firing, each area to receive from $1\frac{1}{2}$ to 2 H., filtered through 3 mm. of aluminium, every four to six weeks. The hardness of the ray should be Benoist 9–10. In addition, a radium plaque may be placed against the hard palate, and a dose of gamma rays also administered. Several—perhaps eight or ten—series of cross-fire treatments may be required to produce the desired result in extensive and long-standing cases. Lesions situated in the nose, at the posterior nares, or in the pharynx, will usually disappear as a result of deep therapy applied to the nose. If necessary, this treatment may be reinforced by the application of radium to the pharyngeal walls, or the *x* rays may be applied to these parts through a metal mouth-tube.

Nasal Neuroses.—Francis[8] finds it possible to lower or raise blood-pressure by touching certain spots of the nasal mucous membrane with the galvanocautery point. Nineteen years ago he discovered that it was possible, in the majority of cases, to relieve asthma permanently by very lightly cauterizing the nasal septum. When Hare proved asthma to be a vasomotor neurosis, and due to an uneven distribution of the blood, Francis was compelled to give up his belief in the muscular-spasm theory of asthma, and seek some other explanation of the effect of nasal cauterization. He then began systematically to take the blood-pressure before and after

cauterizing the nose, and found that in some cases there was an immediate reduction of as much as 20 mm. In the cases in which the pressure came down, the asthma was almost certainly relieved. Francis claims that he can now tell, with a fair amount of accuracy, what effect the touching of any particular spot will have upon the blood-pressure. Cauterizing the inferior turbinates has little or no effect upon the pressure. Within certain limits, the higher on the septum one touches, the greater is the effect in reducing pressure. The effect is produced by acting on the sympathetic fibres running in the mucous membrane, probably by inhibiting vasoconstrictor action.

Guided by the results in cases which he has been able to watch for a number of years, Francis finds that in favourable cases about half of the initial reduction is permanent. In some cases, in which there is a great excess of pressure, almost the whole of the initial reduction remains. Each time the operation is repeated the reduction is, as a rule, rather less. Quite frequently after the third time, the pressure does not tend to rise again. The relief of heart-work by the reduction of the blood-pressure explains why so many patients have remarked that they felt so much younger and better generally. In some cases the pressure has remained down for a year or two, and then risen again and needed further treatment. Francis claims that in a fair percentage of cases the results are lasting.

Francis does not wish to infer that it is possible or desirable to reduce blood-pressure in all cases. It is useless in arteriosclerosis and certain forms of renal disease. His rule is to desist if, after two or three treatments, no permanent reduction has been obtained. Francis claims to have benefited cases of Bright's disease, aortic incompetence, and angina pectoris by cauterizing the nasal septum. In dealing with the vasomotor neuroses, it is not so much the reduction of the blood-pressure one strives after as the stabilizing of the vasomotor system, when the neurosis disappears. When the vasomotor system is unstable, a draught or other localized chill to the surface produces a compensatory vasodilatation in the nose or post-nasal region which provides an incubator for any organisms lurking there. As soon as an even distribution of the circulation is established, the susceptibility to 'head colds' disappears. There are spots in the pharynx which are almost as responsive in reducing pressure as the nasal septum, but the nose is the most accessible region to treat and to chart. The presence of polypi is usually associated with a low blood-pressure. The pressure suddenly rises when a polypus is removed, which may have some bearing upon the fact that asthma is frequently made worse, and not uncommonly first induced, by the removal of nasal polypi. In cases of asthma which present no gross nasal lesion, and in which there are no subjective nasal symptoms, there is the best hope of affording relief by intranasal treatment.

References.—[1]*Laryngoscope*, 1917, Jan., 49 ; [2]*Jour. Amer. Med. Assoc.* 1916, ii, 1663 ; [3]*Brit. Med. Jour.* 1917, i, 865 ; [4]*Amer. Jour. Surg.* 1917, March, 77 ; [5]*Ann. Otol.* 1917, June, 420 ; [6]*N. Y. Med. Jour.* 1916, ii, 1094 ; [7]*Amer. Jour. Roentgenol.* 1917, April ; [8]*Pract.* 1917, Aug., 129.

ŒDEMA, ANGIONEUROTIC. (*See* ANGIONEUROTIC ŒDEMA.)

ŒSOPHAGECTASIA. *Herbert French, M.D., F.R.C.P.*

Œsophagectasia, or the idiopathic dilatation of the œsophagus, is probably far less uncommon than is generally supposed; it is being recognized with increasing frequency now that **Bismuth and X-Ray Examinations** are becoming the rule in cases of dyspepsia. Batty Shaw and Woo[1] have come across six cases recently, and they record them all in detail. The outstanding features which should attract attention to these cases are as follow. When food does not seem to pass down the œsophagus properly it 'sticks' behind the breast-bone, and may even cause pain in the epigastrium; further, this 'sticking' of food has been noticed frequently for a few or many years. Relief is obtained by making the food come back, the patient securing this by tickling the fauces, attempting the act of vomiting, or by coughing, or by taking a deep breath. It will be found that taking a meal is followed by a feeling of difficulty of breathing, described by some patients as a feeling of stifling or of asthma, only relieved by again bringing up the food. In some cases a condition of persistent cough is provoked by taking a meal, as if the dilatation of the œsophagus irritated the lung and caused a reflex cough, the combination of cough with attacks of respiratory embarrassment provoking in these cases the opinion that the patient is suffering from true bronchial asthma. When studying the transit of a bismuth meal by means of æ rays in cases of so-called 'dyspepsia,' it is very necessary to observe the shadow in the œsophagus as well as in the stomach and intestine; two at least of Shaw's cases were missed from want of this precaution.

The patients soon learn that the best way to obviate symptoms is to masticate very thoroughly, and to spend some extra time over their meals, avoiding all 'bolting.' If this plan fails, they generally betake themselves to liquid diet, which they can deal with comfortably.

The authors call attention to the extreme ease, in the absence of a careful history, of confusing these cases with dyspepsia, and even with bronchitis and asthma, for in none of them did the patient volunteer the information which led to suspicion of the condition described.

REFERENCE.—[1]*Lancet*, 1916, ii, 934.

ŒSOPHAGOSCOPY. (*See* LARYNGOSCOPY, ETC.)

ORAL SEPSIS: ITS EFFECT UPON THE FŒTUS AND CHILD. *Frederick Langmead, M.D., F.R.C.P.*

E. Spencer Pierrepont[1] writes from nine years' observation upon marasmic children and their mothers, and upon those children who, although breast-fed, yet suffered from vomiting and diarrhœa, and the mouths of whose mothers he has examined.

The conclusions drawn from some 500 cases are: (1) The toxins of maternal oral sepsis have a very strong influence in a large number of cases upon the vitality of the fœtus, so that the child is handi-

capped from before its birth by a lowered vitality; the consequent marasmic condition is therefore antenatal in its inception. (2) Prematurity of birth and miscarriages, where no other cause can be found, are brought about by the toxic state of the mother, induced by the septic condition of her mouth. (3) Diminution in quantity or alteration in quality of the mother's milk, where no other cause can be ascertained, is due to the affinity of certain toxins for certain secretory cells of the mammæ. When no such diminution or alteration can be demonstrated, then the toxins, and in some cases the micro-organisms themselves, are in the milk. (4) In the toxæmias of pregnancy and of the puerperium the high pressure at which the emunctory organs are working is probably adversely influenced by the toxic state produced by the mouth, and this is the deciding factor, in many cases, which determines the onset of eclampsia and other toxæmic states. He concludes by making a plea for the systematic examination and treatment of the mouths of expectant mothers, and records that in two instances where a mother had had marasmic children, a healthy child was born after the mother's mouth had received attention.

REFERENCE.—[1]*Lancet*, 1917, i, 837.

ORTHOPÆDICS, MILITARY. (*See also* AMPUTATIONS.)

W. I. de C. Wheeler, F.R.C.S.I.

After the first year of war it became apparent that soldiers must be discharged from general hospitals either before or shortly after the removal of foreign bodies and the healing of the wound, or within a month or two after union of a fracture or correction of a deformity. These patients were found in large numbers suffering from cicatricial contractions, immobile joints, mal-united fractures, nerve palsies, and other conditions which made them unfit for either military service or civil life. To cope with these cases Orthopædic Centres were opened under the guidance of Colonel Sir Robert Jones, Inspector of Military Orthopædics. The goal is to establish at convenient centres a staff and equipment suitable for the treatment of disabilities of the limbs the result of war wounds. From the experience of cases arriving in these centres the orthopædic surgeon has learned the great value of preventive and prophylactic treatment, so far as resultant deformities are concerned. The great majority of compound fractures of the forearm, for example, appear at an orthopædic centre perhaps with loss of the power of supination. This loss can be remedied by orthopædic means even in old-standing cases, but the lesson has been learnt from experience that all fractures of the forearm should in the first instance be treated in supination. Again, injuries of the musculospiral nerve, and injuries to the wrist-joint, should be treated from the outset in the position of dorsiflexion on Jones's 'cock-up' splint, for if this position is not adopted the overstretching of the extensor tendons prevents recovery. Injury of the musculospiral nerve causing extensor paralysis or a direct injury to the wrist-joint

without a nerve lesion may be followed by aggravated flexion contracture rendering the hand useless (*Fig.* 81). In the case of the shoulder-joint, the use of an abduction splint prevents the common adduction deformity so difficult to cure when of old standing. In the case of the hip-joint, abduction is the position of choice, and should be adopted from the time the patient reaches the first hospital.

Fig. 81.—From a photograph illustrating flexion contracture of wrist.

In the orthopædic centres fresh fractures are received whenever possible, especially fractures of the femur, and in these cases the surgeon who already has under his care many old cases with little if any shortening, with perfect alinement and no rotatory displacement, will, nevertheless, be occupied in a certain number of cases by the treatment of genu recurvatum and immobile joints. The genu recurvatum is due to a want of respect for the natural curve of the femur when the fracture is treated by extension in a Thomas splint, and the immobile joints often to a lack of interest on the part of the surgeon once the wounds have healed and the shortening and gross displacements have been corrected. The duty of the surgeon in the 'centre' is to immobilize fractures in such a way that the deformities which he sees in the old cases are forestalled in the new. Obstacles to the movement of the joints and to the play of tendons are removed, and the continuity of the nerves is re-established. Massage, electrical treatment, and baths are provided on an elaborate scale.

Attached to each 'centre' are curative workshops and a gymnasium. The part played by the workshops is of great importance, not only because the man is taught a trade to fit him for civil life, but because the purposeful movements enlist the will and have a most beneficial effect on the mind and morale, while at the same time the patient is subconsciously curing the deformity.

Johnson Smith[1] suggests a new method for *immobile or stiff shoulder-joints*. The apparatus designed by this writer consists of a vertical wheel 4 ft. in diameter, rotation of which may be produced by hand, pedal, or otherwise. The patient grasps a clutch on the circumference. The chair on which he sits is capable of moving up and down, his back being fixed to a T-shaped structure by belts securing the waist and shoulders in such a way that the shoulder faces the axis of the wheel, and the movements of the spinal column and scapulæ are limited. To save a strain on the arm when the clutch which the patient holds is moved towards the rim, the position of

the spoke is adjusted by means of a hinge-joint which allows the outer end to be moved nearer the patient by means of a sliding attachment fixed to the rim. Later on a skipping rope, 14 ft. in length, is fastened to a tree or wall at a point level with the patient's shoulder, a small weight being fixed to the centre of the rope. When exercising with this contrivance, the scapulæ should be fixed by a belt round the shoulder and chest.

P. J. Verrall[2] describes the method of producing *supination of the forearm* by **Plaster.** He refers to the numerous cases of gunshot wounds of the upper limb in which the forearm is held in a position midway between pronation and supination, and passive supination is impossible. Verrall uses plaster-of-Paris in the following manner: The plaster is applied over felt and consists of two parts. The upper reaches from the middle of the arm to the middle of the forearm, the lower from the middle of the forearm to just above the metacarpal bones, a hole being left for the thumb to protrude. On either side of the interval between the two portions, pieces of metal strips are incorporated in the plaster; these are $\frac{3}{4}$ in. wide and 3 in. long, 1 in. being turned up at a right angle, and the other 2 in. notched so as to form spikes to insure firm incorporation in the plaster (*Fig.* 82). One

Fig. 82.—Metal strips used in supination of forearm by plaster. (*By kind permission of the 'British Medical Journal.'*)

Fig. 83.—Supination of forearm in plaster. (*By kind permission of the 'British Medical Journal.'*)

bit of metal is fixed into the radial and another into the ulnar side of the lower part, and the two other pieces are inserted into the inner and outer aspects of the upper part. When the plaster is firmly set, pieces of rubber tubing are stretched round these two pairs of metal

pieces and are gradually tightened from day to day, supination being complete when the two pairs are opposite one another (*Fig.* 83). Extra felt padding may with advantage be put over the second metacarpal, at the end of the radius and on the ulnar border of the hand.

Hall Edwards,[3] who discusses *physical apparatus* used for remedial treatment, has devised a machine for exercising and measuring movements of pronation and supination. Although mechano-apparatus as a rule do not interest the patient sufficiently to bring his will power into action, yet the use of an apparatus such as the above has many advantages, as it records the daily improvement in the patient's condition, and in this way stimulates the mind in much the same way as do various recreations. The recording dial shown in the instrument, designed for exercising the elbow, attracts the imagination of the soldier and encourages him to persevere (*Fig.* 84).

Haughton, of Dublin, has designed a similar apparatus.

Fig. 84.—Machine for exercising and measuring the movements of pronation and supination, showing the arm fixed in position to measure pronation, and the pointer at zero. (*By kind permission of 'Archives of Radiology and Electrotherapeutics.'*)

One of the most striking features in the cases admitted into orthopædic centres is the *contractures and deformities of the hands and feet* without direct nerve or muscle injury. These deformities can scarcely be attributable to faulty treatment such as prolonged fixation in splints. Many writers, more particularly Tinel, have tried to explain these attitudes. Paul Descoust[4] describes vicious attitudes of the feet as the result of indirect trauma. In one class of case they can be accounted for, according to Descoust, by the joint assuming the attitude of greatest ease immediately after the wound, and subsequently becoming a more permanent deformity which resists correction owing to adaptive shortening of tendons, ligaments, etc., on the one side, and corresponding stretching on the other. In another class of case some slight trauma, not immediately involving the joints, muscles, or nerves, produces a reflex contracture (*Fig.* 85) as described by Babinski, with vasomotor disturbance and accentuated cyanosis. In these cases there is exaggeration of the reflex

and of the mechanical excitability of muscles, and disturbance of the sensation in the corresponding area, with a hyperexcitability of the muscle to faradism. These reflex contractures are distinguished from hysterical contractures by persistence during anæsthesia and by becoming exaggerated in attempts at reduction under chloroform. In the hysterical cases, on the other hand, the contractures disappear under anæsthesia and return when the patient awakes. The real cause of reflex and so-called hysterical contractures is quite uncertain, and it would be almost better in the interests of advancement if the terms reflex and hysterical could be temporarily expunged from orthopædic nomenclature. Descoust says that the cause is as yet unsettled. Some, at least, may be produced by lesions such as minute hæmorrhage in the central nervous system, or some functional disturbance in the cortex.

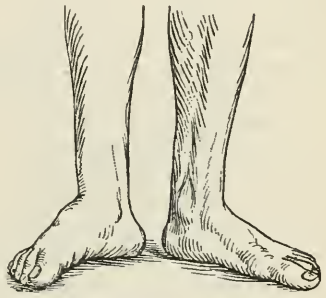


Fig. 85.—Reflex club-foot.

In addition to attitudes assumed to relieve pain and those of reflex origin, Descoust gives a third class, which he describes as hysterical (*Figs.* 86, 87). He contrasts the hysterical and the reflex cases—the former as a psychic phenomena, so to speak cortical, while the reflex has a purely local peripheral cause. The loss of motion and sensation in hysterical cases, the latter often very considerable, does not correspond with the anatomical distribution of the nerves. The reflexes are normal, and there are no electrical disturbances in the hysterical cases. There is a motor amnesia, the patient having lost the idea that he is able to correct the deformed position of the limb.

Fig. 86.—Hysterical contracture of the toes.

Fig. 87.—Hysterical club-foot.

(*Figs.* 85, 86, 87 *redrawn from* '*La Presse Médicale.*')

The paper does not lose sight of the cases of deformity due to malingering. This can usually be discovered by carefully watching the patient, by concentrating his attention on some remote object, and, if necessary, watching him while asleep. All the cases, from whatever cause, if sufficient length of time elapses, become real deformities owing to shortening and lengthening of the muscles and ligaments in the neighbourhood.

The first desideratum in early cases is to prevent pain and to encourage the wounded man to move the joints little by little in normal directions. In the reflex deformities all kinds of treatment have been followed by disappointing results. Some go so far as to recommend removal of the astragalus or fixation of the joint by arthrodesis. In the hysterical cases attempts can be made at reduction, and good results are occasionally obtained by suggestion. The real treatment is prophylactic. In this connection it is interesting to note that representatives of the United States Army Medical Service are now studying the deformities under review in order to promote scientific prevention at the earliest possible moment at the Front. As an example of treatment by suggestion, the writer has had success by the following method: A patient suffering from hysterical deformity not yet fixed is told that all such cases are curable without operation. He is anæsthetized, and while undergoing narcosis is repeatedly told that he is about to be cured; he is deeply anæsthetized for a few moments, and allowed to recover consciousness. During the early stages of ether drunkenness he is told that he is cured, and is directed to move the limb in all normal directions. In one case so treated the man suffered from an injury to the hand, and for fifteen months believed he was unable to abduct the shoulder. On making the attempt the deltoid muscles stood out as if under great strain, but no responsive movement was elicited. The arm could easily be raised passively, the shoulder-joint being quite free. By the above method of suggestion the patient in a few minutes was able voluntarily to raise his arm above his head, and there was no relapse.

Deformities of the Hands.—As in the case of the feet, the hands and fingers may assume contracted positions to ease pain. Reflex hysterical and malingering deformities are common, but the greater number of contractures are due to a direct or indirect nerve lesion. Many of the cases with an injury of the median or ulnar nerve below the origin of the muscular branches show signs of muscular paralysis, as if the nerve lesion were a high one. This phenomena may be accounted for by the fact that anæsthesia of the fingers after a time leads the patient to suppose that where he cannot feel he cannot move. Release of the nerve from a scar or an end-to-end union which restores sensation will often restore movement. By education, exercise, and massage, the patient can be taught that movement is possible where sensation is absent. In other cases, paralysis or contractures may occur, following a lesion of the nerve below the muscular branches, by the establishment of an ascending neuritis.

Compression, interruption, and irritation of the ulnar and median nerves, or both, are responsible for a large number of cases of crippling deformity of the hand. No success can be expected by operation on

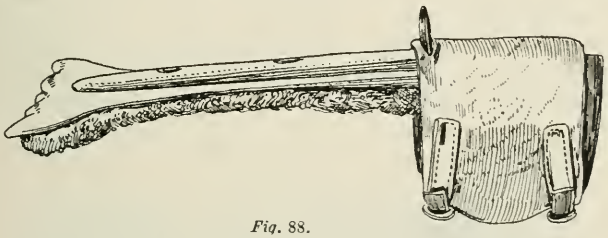


Fig. 88.

(*Figs.* 88–90 illustrate the elastic-traction method in flexion contracture of fingers.)

the nerves or by transplantation of tendons, so long as the joints are stiff and the muscles spastic. In the Blackrock Orthopædic Centre, after much experimentation with the use of forcible manipulation

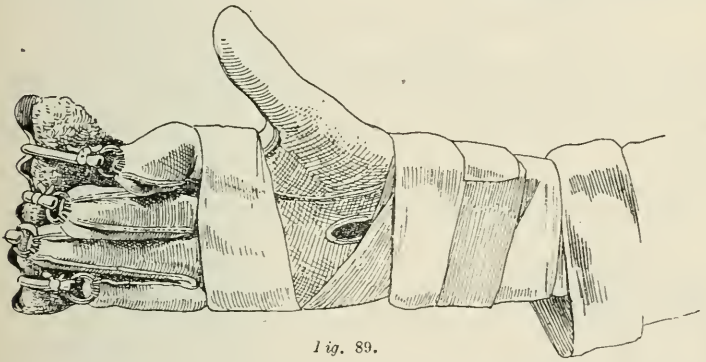


Fig. 89.

and the application of plaster-of-Paris for the treatment of contractures of the hand, the best results have been obtained by the use of **Elastic Traction.** Thus, in flexion contractures of the fingers a metal

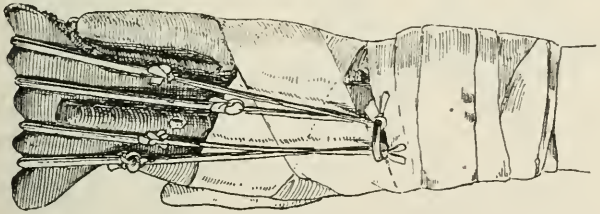


Fig. 90.

splint is applied to the back of the forearm, sufficiently long to project some inches beyond the back of the hand. At the end of this dorsal splint a roller is fixed, the same breadth as the hand (*Fig.* 88).

The patient is fitted with a glove with small rings attached to the finger tips (*Fig.* 89). To these rings are attached round rubber elastics, which pass over the roller and are fixed to a ring on the back of the splint (*Fig.* 90). The pull of the elastic in the direction of extension of the fingers causes sufficient discomfort to stimulate the patient to move the fingers into further flexion. The elastics are thus tightened, and the fingers soon relax again under the pull. In this way the patient throughout the day is constantly moving the

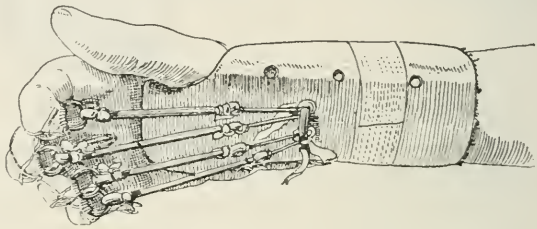


Fig. 91.—Elastic traction in contracture of fingers in extended position.

affected joints, while there is always a steady pull in the direction of correction. This system of mobilization and traction results in favourable cases in promoting a cure by the re-education of the weaker muscles.

In the case of contracture in the extended position a small Jones's 'cock-up' splint is applied to the palmar surface of the wrist and hand. A glove is fitted as before, with rings on the finger tips, and elastic cords are brought from these to a ring fixed on the portion of the splint opposite the wrist (*Fig.* 91). The patient constantly moves the fingers in the direction of extension, to relieve the pull, but by so doing only tightens the elastic, and the increased traction gradually brings the fingers into a flexed position. When the splint is removed after some weeks of treatment, the joints are mobile and the extension contracture is relieved. In like manner, splints have been designed for the knee-joint and elbow-joint, as illustrated (*Figs.* 92–95).

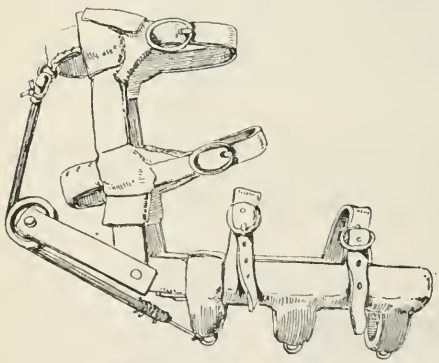


Fig. 92.—Elastic traction for knee-joint contractures.

The preliminary observations on these cases of hand contracture convince the writer that force and fixation only result in the substitution of one deformity for another, and that results can only be

obtained by constant and gentle mobilization, together with re-education of the muscles. All these conditions are fulfilled by treatment with splints supplemented by elastic traction.

The writer (W. I. de C. W.) designed the glove shown in *Fig.* 89 in the first instance for fingers held in the position of incomplete extension, and his assistant, Captain McCullagh, designed the two splints shown in *Fig.* 94 for the knee-joint. Slight flexion can be increased by a pull of rubber attached to the back of a Jones's knee-cage. The splints may be removed for massage and electricity of the contracted joint, and for immersion in hot water followed by a cold douche. In this work the writer had the advice and co-operation of his colleague, Major Haughton, and the assistance of Capt. McCullagh, and of Drs. Russell and Reams, of the United States Army. Dr. Russell has systematized the treatment and is publishing the results.

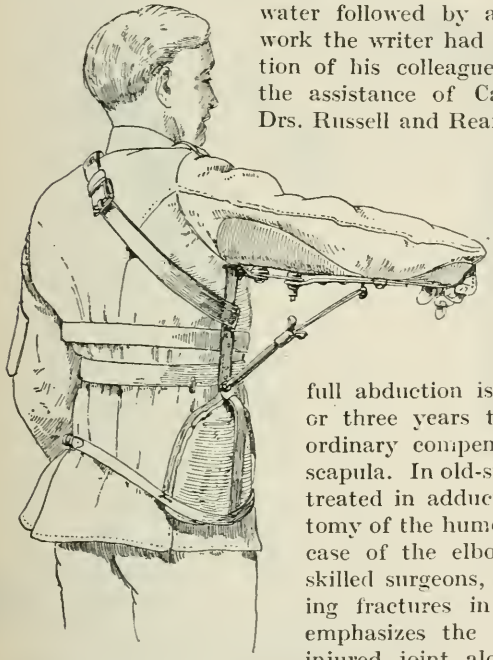


Fig. 93.—Elastic traction for elbow-joint contractures.

Aitken[5] emphasizes the importance of treating shoulder injuries in the abducted position. In children full abduction is permissible, for in two or three years they develop an extraordinary compensatory mobility of the scapula. In old-standing cases improperly treated in adduction, a cuneiform osteotomy of the humerus is indicated. In the case of the elbow, he urges, like other skilled surgeons, the importance of treating fractures in full flexion, and also emphasizes the necessity of leaving the injured joint alone for three weeks or more. It is the essence of bad surgery to persist in daily passive movements, which not only cause pain but injure the newly-formed callus. Stimulated by the injury the young callus proliferates, and becomes excessive, leading to stiffness of the joint. Aitken rightly condemns the use of the internal right-angle splint. This splint pushes the internal epicondyle outwards, and often distorts the line of the elbow-joint. Furthermore, the forearm is fixed by this splint half-way between supination and pronation, instead of in full supination.

Gustav Fischer,[6] in a German paper, discusses the treatment of paralysis and stiff joints. He states that where there is loss of substance in a nerve, calf's arteries hardened in formalin and filled with agar form a suitable medium for the outgrowing nerve fibrils.

To prevent relapses after freeing of a tendon from cicatricial tissue he recommends the use of semi-solid sterile lard, which takes several weeks to become absorbed.

Cooper[7] deals with contractures and allied conditions. He distinguishes between a muscle in a state of contracture and one which has undergone fibrous change. He states that, to keep diseased parts at rest, nature immobilizes the neighbouring joints by establishing

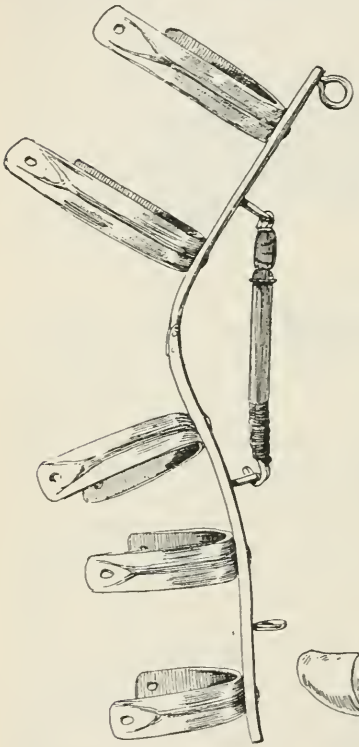


Fig. 94.—Splint for increasing flexion of the knee. Note the rubber band, which can be attached at various levels. (*Wheeler and McCullagh.*)

Fig. 95.—Elastic-traction method in application.

a defensive spasm of the muscles, or in some cases by creating a functional paralysis. This often leaves a serious damage to the function and structure of the muscles. Passive movements should be deliberate and steady, and not jerky. Forcible correction under anæsthesia is to be depreeated as a rule : it leads to rupture rather than stretching of the tissues, and the pain and effusion for some days afterwards prevents further manipulation of the joint.

Oscar Stracker[8] refers to orthopædic appliances in the military

hospital at Vienna. The hospital is provided with a staff of expert mechanicians, whose duty it is to invent new apparatus and repair models. The abduction splint for injuries to the shoulder used in this hospital is provided with a spring arrangement which keeps the arm in abduction, but yet allows adduction movements to be made. Adduction of the arm by compressing the spring gives the impetus for abduction. With such an apparatus *in situ*, painters, tailors, builders, etc., were able to resume work. For paralysis of the flexors of the elbow, an apparatus similar to Jones's knee-cage was fitted to the arm and forearm with a hinge exactly opposite the joint; two wire springs were crossed in front of the elbow and attached to the arms of the cage above and below the joint. The springs were sufficiently tight to keep the arm fixed in flexion, but to allow for extension by the triceps.

For raising the point of the foot in 'dropped-foot,' Stracker uses a simple contrivance. From a metal bar attached on either side of the leg and passed down to the heel of the boot, two short horizontal rods project backwards above and below the hinge at the ankle. Between the extremities of these rods a pressure spring is inserted, the action of which is to dorsiflex the foot. He concludes with what he appears to regard as the fundamental dogma of orthopædics: "That which is simple is good; that which is complicated is bad."

Lesions of the Knee-joint.—George Davis[9] has designed a method of plaster splinting for the treatment of knee lesions. Essentially this method is a thigh plaster and leg plaster conjoined by three equidistant arches of hoop-iron. The splint can be made much more serviceable by having an extension of plaster around the pelvis—a spica. The leg splint need not reach lower than to 4 in. above the malleoli. Each metal bridge is covered with plaster bandage round and round, until by working the surface with wet fingers the required smoothness is attained and the junction with the splint made perfect. The mackintosh slips are turned back coat-sleeve-wise, the stuff being cut when interrupted by the irons. The various parts are slightly fixed with strapping. When quite dry the driers are applied, and over this, when hard, spirit varnish, over the whole plaster surface. This makes it resistant to everything short of continual soaking or the abundant use of peroxide of hydrogen, and prevents the troublesome shedding of powdery particles from the plaster surface.

Henderson[10] comes to the following conclusions: (1) Damaged semilunar cartilages should be accorded the careful treatment by rest and fixation that is given an ordinary fracture of one of the long bones. Recurrent locking will then be an uncommon sequela. (2) Recurrent locking produced by a loose or fractured semilunar cartilage or loose body demands removal of the meniscus or body under the strictest asepsis. A judicial exploration of the joint should be made at the same time. (3) The condylar incision is the incision of choice for the removal of the semilunar cartilages. (4) For the removal of loose bodies, the split-patella incision is usually best. (5) A ruptured crucial ligament is better treated conservatively than by operation.

Sir Robert Jones[11] points out that the derangements to the knee-joint are caused as a rule by injuries to the muscles and ligaments, semilunar cartilages, and the fatty tissue of synovial fringes. For example, behind and to the inside a strain of the semimembranosus, or of the biceps at its attachment to the head of the fibula, may be diagnosed by local tenderness on pressure, and pain on resistance to voluntary flexion. Strain of the attachment of the patellar ligament is more important, and may be aggravated in a case where the tubercle of the tibia is developed as a separate epiphysis. In these conditions he recommends a back-splint to prevent flexion or strain. In less severe cases a firm band of sticking-plaster applied around the thigh above the patella, by taking some of the muscular pull, may relieve the condition.

Soule[12] recommends the application of the **Bone-graft** in treating partial or complete avulsion of the adolescent tibial tubercle (Oswood-Schlatter's disease). The condition is always found in youth before bony union of the tibial beak and the tibia has taken place. Soule thinks that the injury to the bursa overlying the tubercle is the chief cause of pain and discomfort. The operation recommended consists in pinning the injured beak to the tibia by means of an autogenous bone pin, manufactured in the lathe supplied with Albee's bone set.

Sir Robert Jones[13] refers to the treatment of *stiff joints*. The class of case which yields to forcible manipulation to break down little fibrous bands of adhesion is so rare in military surgery that Jones thinks a surgeon without considerable experience had better pause, reflect, and refrain before using force in the manipulation of joints. He gives the following four examples :—

1. First assume that a small fragment of metal has penetrated the front of the knee-joint, tearing the capsule and aponeurosis, but has been removed, and the wound has healed without suppuration. The movement of the joint later is limited by pain, localized to near the wound and a definite stop to movement. The knee is flexed under an anæsthetic ; one or two definite snaps are felt, and all is well. This is a simple case of a few fibrous bands about the capsule which were stopping movements.

2. Next we will take a similar injury followed by effusion and a brief mild suppuration in the joint, relieved by cleansing and very temporary drainage. Movement of the knee is limited on attempting movement under anæsthesia ; no great resistance is felt, but there is a soft tearing sensation. The experienced surgeon stops at once. He is not breaking one or two bands, but is tearing a diffuse soft fibrosis extending all through the joint, and the result of his assault will be the formation of a more dense fibrosis. By waiting until the pathological changes are ended, movement may be restored in gentle stages of persuasively conducted alternate attack and rest.

3. In another case a piece of shell has torn the quadriceps above the patella, and the muscle is firmly fixed down to the bone. If the

surgeon attempts to flex the knee forcibly, he runs a big risk of fracturing the patella; but if he puts the limb on a back splint, to relax the quadriceps completely, so that there is no strain on the scar, and massages the scar, it may loosen in a few weeks and become merely a fibrous intersection in the muscle, and then movement of the knee may be commenced.

4. There has been a septic fracture of the femur, and the quadriceps, especially the vasti, have become infiltrated, first with toxic fluids and later by a matted fibrous tissue. Any attempt to stretch this by force is doomed to failure, and will probably lead to a fracture of the patella. The best way of attacking such a case is to apply a splint which will allow of gradual flexion in stages. It may take two or three months to restore a range of movement of 45 degrees. With that range of movement the patient can walk with a little knee action and not merely with a stiff leg. After that, by use and help, he will gradually get more and more movement in the knee as the fibrous tissue in the muscle becomes absorbed.

References.—[1]*Pract.* 1917. June, 575: [2]*Brit. Med. Jour.* 1917, ii, 150; [3]*Arch. Rad. and Electrother.* 1917. Aug., 82; [4]*Presse Méd.* 1917, June 7, 330; [5]*Lancet*, 1917, i, 10; [6]Abstr. in *Brit. Med. Jour.* 1917. i, 204; [7]*Brit. Med. Jour.* 1917, i, 109; [8]*Beitr. z. klin. Chir.* Heft. 29, 653 (abstr. *Brit. Med. Jour.* 1917, i, 276); [9]*Lancet*, 1917, i, 298; [10]*Jour. Amer. Med. Assoc.* 1917, i, 321; [11]*Injuries to Joints* (Oxford War Primers); [12]*Surg. Gyn. and Obst.* 1916, Sept., 353; [13]*Brit. Med. Jour.* 1918, i, 41.

OSTEO-ARTHRITIS. (*See* Joints, Surgery of.)

OSTEOMYELITIS.

The use of **X-rays** in diagnosis (p. 48).

OTITIS MEDIA. (*See* Ear).

OVARY, DISEASES OF. *W. E. Fothergill, M.D.*

Novak[1] writes that free bleeding in the pelvis, whether it extends into the abdomen or not, is still regarded as prima facie evidence of ectopic gestation. He records a case of hæmorrhage from a ruptured follicular cyst in the right ovary, which is one of many proofs that grave abdominal hæmorrhage is not pathognomonic of extra-uterine pregnancy. Von Beust collected thirty-six of these cases in 1914, and Novak has noted three besides his own recorded since that date. The diagnosis of ruptured tubal pregnancy is generally made in these cases, and as the treatment is the same in both conditions no harm is done. Most cases are unrecorded.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 1160.

OZÆNA. (*See* Nose, Diseases of.)

PALLIDAL SYSTEM, PRIMARY ATROPHY OF. (*See* Paralysis Agitans.)

PANCREAS, SURGERY OF.

E. Wyllys Andrews, M.D., F.A.C.S. (Chicago).

Deaver has done much to put the surgery of the pancreas on a more definite clinical basis, and contributes two more articles this year.[1, 2] Our knowledge of pancreatitis has increased, and case reports are becoming more frequent. The author believes pancreatic disease is much more frequent than is commonly supposed. Many of the undiagnosed attacks of pain in the upper abdomen, and probably many of those diagnosed as bile-tract or stomach disturbances, are due to the pancreas. The frequent finding of large, indurated pancreases at operation supports this view. He regards the disease as a lymphangitis secondary to gall-bladder-duodenal infection. Hæmatogenous infection can occur, and also bile, under pressure from a stone in the ampulla of Vater, may set up such a train of symptoms.

The digestive action of pancreatic juice brings new factors into play. The mere injection of bile, for instance, as experiments show, can initiate the entire train of symptoms. That is, removal of the cause does not stop the progress of the disease, but it goes on to hæmorrhage, sloughing gangrene, or suppuration. Pancreatic juice *per se* is not active, but many other substances besides the normal enterokinase of the intestine can actuate it. Just what it does in acute pancreatitis is still a problem for study. Besides the local pathology of fat necrosis, hæmorrhage, and rapid gangrene, there is a most profound and rapid toxæmia unless drainage is established. The acuteness and severity of this toxæmia, and the short time in which collapse and death occur, are surprising.

The author's series comprises 13 cases, of which 3 died, a mortality of 23 per cent. One of these was moribund when operated on, and died on the table. The other two deaths, it is interesting to state, occurred in cases in which the pancreas itself was not drained, cholecystostomy and removal of stones only being performed. In 3 other cases in the series cholecystostomy alone was done. Thus 2 of the 5 who had only bile-tract drainage died, showing, the author thinks, that this procedure is insufficient to relieve the pancreatic infection. On the other hand, five cases in which the pancreas was freely drained all recovered. He suggests that pancreatic drainage might have saved the two that died. Incisions and blunt punctures into the pancreas can be made, and gauze drainage surrounded by a rubber drain inserted. Drainage was all done by the abdominal route.

The only contra-indications to operation, in Deaver's opinion, are: (1) Profound shock; a few hours' waiting to give stimulants, intravenous salines, adrenalin, etc., is warranted. (2) Cases definitely subsiding when first seen, especially those with a history of previous mild attacks.

Concluding, he emphasizes: (1) The secondary relationship of the disease to pre-existing anti-abdominal foci of infection; (2) The character of the toxæmia; (3) The necessity for prompt action; (4) The value of direct and free drainage.

Martin[3] reports three cases of fulminating type of pancreatitis, all of unusual character. Case 1 was operated on the diagnosis of cholecystitis. Fat necrosis was noticed as small white spots on the omentum and mesentery. The pancreas was immediately exposed and examined, but nothing abnormal was found. Death occurred at the end of twenty-four hours. On necropsy the pancreas appeared normal until removed, when small areas of hæmorrhage and necrosis were found on the medial portion of the organ. The head and tail were normal. This case shows how death may occur from simple toxæmia with no involvement of the peritoneum or adjacent viscera.

"In Case 2 it is a very interesting and instructive fact that the vomit was fæcal. It is stated in a recent text-book of surgery that the vomit in acute pancreatitis is never fæcal. Certainly fæcal vomiting is most suggestive of obstruction, and was so in this case. The vomit both looked and smelt fæcal."

"In Case 3 the great interest lay in the apparent recovery of the patient after the acute stage. Serious symptoms, however, recurred, and led to a fatal termination. The patient had so far recovered from the acute stage, at the end of which she was admitted (which seemed probably due to the passage of gall-stones or their retention in the common duct), that I discussed with her the desirability of having an operation for removal of gall-stones before another attack came on; and yet at that time the acute pancreatitis must have been passing into the sloughing stage, because at autopsy the entire pancreas and adjacent portion of the duodenal wall had sloughed."

Gammeltaft[4] reports a case of acute pancreatitis with a unique feature. The patient was taken suddenly ill with acute abdominal pains, mostly in the right lumbar region, and vomiting. She had some fever. A few days later a bulging over the crest of the right ileum appeared, which was incised, and some old blood drained out. A month later the incision was enlarged and a large amount of pus and necrotic fatty tissue was removed, evidently the slough from a pancreatic disease. This is the first case report of abscess in the right lumbar region. A few have been found laterally on the left side.

Giovanni calls attention to a new symptom of pancreatic disease. This is a pulsation palpable deep in the abdomen to the right of the mid-line. It is evidently transmitted from the aorta by the enlarged and hardened head of the pancreas. Aneurysm of the cœliac axis gave a similar pulsation.

References.—[1]*Boston Med. & Surg. Jour.* 1917, i, 187; [2]*Jour. Amer. Med. Assoc.* 1917, ii, 434; [3]*Bristol Med.-Chir. Jour.* 1917, July, 80; [4]*Ugeskrift Forhaeger*, 1917, Oct., lxxviii, No. 43, p. 1899.

PANCREATIC INSUFFICIENCY, DIAGNOSIS OF.

Robert Hutchison, M.D., F.R.C.P

Recognizing that there are no clinical symptoms pathognomonic of disease of the pancreas, Decker[1] has carefully investigated the chemical and other tests for pancreatic insufficiency. He classes these as

follows: (1) Tests of external secretions, e.g., oil test-breakfast, Sahli's capsule test, Schmidt's cell-nuclei test, examination of stools for excess of nitrogen or fat or for trypsin; (2) Tests dependent upon functions of the pancreas other than external secretion e.g., Cammidge's test, the presence of diastase in the urine, and Loewi's adrenalin test (dilatation of the pupil on the instillation of adrenalin into the conjunctiva). He subjects all these tests to a critical examination—especially the adrenalin test—and concludes that none is trustworthy, and that a test is yet to be found which will enable one to detect a pancreatic lesion early and with certainty.

Reference.—[1]*Boston Med. and Surg. Jour.* 1917, i. 867.

PARALYSIS AGITANS. *J. Ramsay Hunt, M.D.*

Primary Atrophy of the Pallidal System.—Ramsay Hunt[1] thus describes a juvenile system disease of the paralysis agitans type, characterized pathologically by an atrophy of the large motor cells of the corpus striatum. It is now a century since James Parkinson wrote his celebrated essay on the 'shaking palsy,' and outlined the chief clinical features of the disease which justly bears his name. Like Ménière's classical description of Ménière's disease, however, it was merely a clinical delineation, by means of which a certain group of cases could be readily recognized and differentiated. Ménière's disease in the course of time has been found to be dependent on a number of distinct pathological entities, and this the writer believes will be the fate of Parkinson's disease. In short, paralysis agitans is a syndrome, with a definite and characteristic complex of symptoms, which may be caused by a variety of pathological lesions involving the same anatomical mechanism.

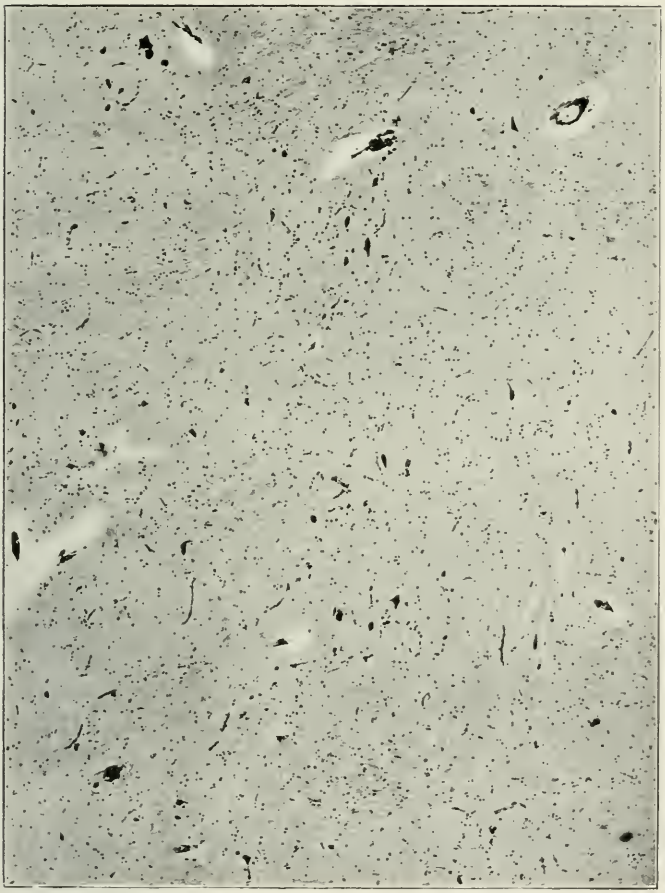
Since Parkinson's time there have been many notable contributions to the symptomatology of this subject, as well as a vast amount of pathological research in an effort to find and identify the essential lesion of the disease. The theories, even to-day, include such widely dissimilar structures as the cerebral cortex, cerebellum, basal ganglia, brain-stem, and the spinal cord. Even the glandular and myogenic conceptions are still upheld by some.

Clinically, three types are recognized—viz., the *presenile* and *senile*, the *symptomatic*, and a rare *juvenile* form. There are also certain subdivisions corresponding to variations in the symptomatology, e.g., the paralysis agitans without tremor, the more rare paralysis agitans without rigidity, and various irregular or incomplete manifestations of the disease—*formes frustes*.

It is unlikely that an affection of this character, which is so diverse in its clinical manifestations, should have as its basis a uniform pathological lesion. The paralysis agitans group undoubtedly includes a variety of forms which are related clinically, as they present the chief symptoms of Parkinson's syndrome (rigidity and tremor), but which may be distinguished by difference in the localization and character of the underlying pathological lesions. In brief, our posi-

PLATE XLII.

PROGRESSIVE ATROPHY OF THE GLOBUS PALLIDUS

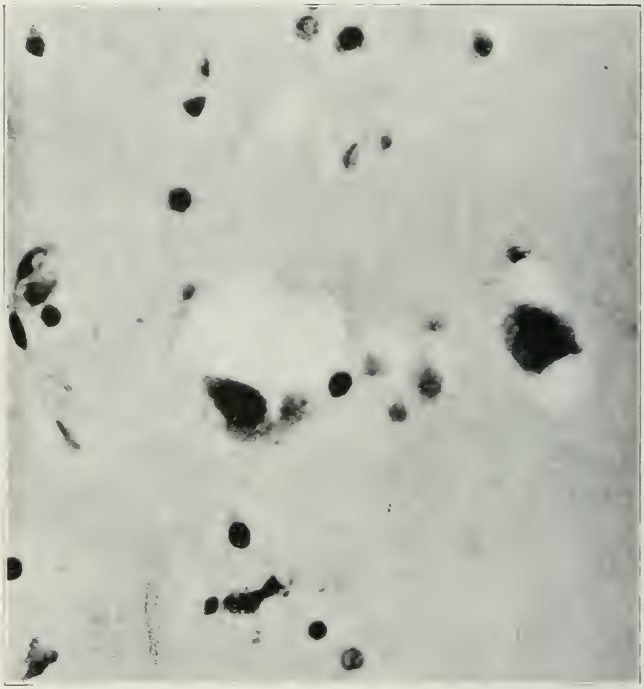


The globus pallidus: external segment. Showing general atrophy and diminution in number of the large motor cells of the globus-pallidus system. Note the moderate increase of glia nuclei, and the large hyaline concrements, staining intensely blue. Toluidin blue. (× 384.)

Plates XLII to XLV, and the illustration in text, are by kind permission from "Brain."

PLATE XLIII.

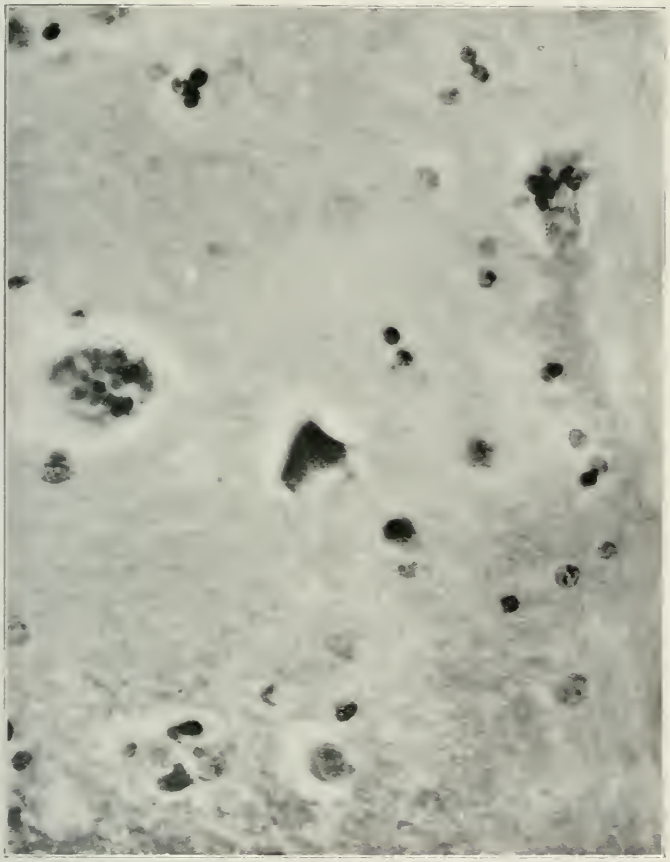
PROGRESSIVE ATROPHY OF THE GLOBUS PALLIDUS—*continued*



Showing atrophic cells of the globus-pallidus system. Toluidin blue. (3320.)

PLATE XLIV.

PROGRESSIVE ATROPHY OF THE GLOBUS PALLIDUS—*continued*



Caudate nucleus, showing atrophy of a large multipolar cell of the globus-pallidus system. Toluidin blue. (× 3840.)

PLATE XLV.

PROGRESSIVE ATROPHY OF THE GLOBUS PALLIDUS—*continued*

Horizontal section through the cerebral peduncle and basal portion of the corpus striatum. Showing thinning of the fibres of the ansa peduncularis. Weigert-Pal method.

tion toward paralysis agitans to-day is much what it was towards spastic paralysis (paralysis with its associated spastic phenomena) before the function and course of the pyramidal tracts were known.

In the present study, Ramsay Hunt attempts to distinguish the juvenile form of paralysis agitans from the larger syndrome, on the basis of certain definite pathological changes in the motor cells of the corpus striatum, i.e., the pallidal system or mechanism. The juvenile type of paralysis agitans he regards as a pure system disease, characterized by slowly progressive atrophy of the efferent motor neurons of the corpus striatum, while the paralysis agitans of later life, the presenile, senile, and symptomatic forms, are dependent upon senile and vascular degenerations in the course of this same mechanism. The primary atrophy of the pallidal system would therefore represent in the domain of the motor system of the corpus striatum the same pathological type as primary lateral selerosis in the cortico-spinal motor system. The one is a primary atrophy of the pyramidal-tract system, the other of the efferent pallidal system.

Four cases of juvenile paralysis agitans are recorded, beginning in the second and third decades of life, viz., the 13th, 15th, 26th, and 30th years respectively. In the case beginning at the 15th year, death occurred at the age of 40, and a careful study of the central nervous system was made by modern histological methods. No essential lesions were found excepting of the corpus striatum. In this region, the large motor cells of the globus pallidus type were diminished in number (*Plate XLII*); the reduction estimated by comparative cell-counts varied from one-sixth to one-half of the normal. The greater number of the remaining cells were in various stages of chronic atrophy (*Plate XLIII*). These cellular changes were not confined to the cells of the globus pallidus proper, but were also evident in the nucleus basalis of Meynert, which lies beneath the globus pallidus in the substantia innominata of Reichert. The large cells of similar type which are normally present among the small polygonal ganglion cells of the caudate nucleus and putamen were also considerably reduced in number and in various stages of chronic atrophy (*Plate XLIV*).

The cellular atrophy in this case was therefore confined to a single type of cell, viz., that of the globus pallidus. It was apparent in the globus pallidus proper, also in the nucleus basalis of Meynert, and was especially marked in the caudate nucleus and putamen (the neostriatum). The globus pallidus cells of the corpus striatum are therefore regarded as a well-defined anatomical and physiological system, the *pallidal system*, and as the essential motor or projection system of the striate body. Corresponding to the atrophy of the efferent cells of the globus-pallidus mechanism, there was a moderate secondary thinning of the strio-hypothalamic radiations, viz., the lenticular bundle of Forel, the strio-Luysian fibres, and the ansæ lenticularis and peduncularis (*Plate XLV*). This diminution was moderate in degree, and was evenly distributed. It was nevertheless quite evident.

In view of these findings, a separation of the juvenile and early adult forms of paralysis agitans from the senile type is suggested on the basis of the pathological alterations in the motor neurons of the globus-pallidus system. For this affection, the name *progressive atrophy of the globus pallidus* is proposed, as best expressing the nature, characteristics, and localization of the atrophic process. The term 'globus pallidus,' as used here, refers to the globus-pallidus mechanism, and includes all the cells of the pallidal type in the corpus striatum, namely, those of the putamen, caudate nucleus, and the globus pallidus proper. *Primary atrophy of the pallidal system* is equally descriptive, and may be found preferable as a designation for this type of atrophy.

Further pathological investigation will be necessary in order to show how frequently these same pathologieal changes are met with when the disease begins in the later period of life. It is probable, however, that in the late forms of the disease, senile degenerations, vascular and perivascular lesions, will play the more important rôle.

Definition.—Progressive atrophy of the globus pallidus may therefore be defined as a system disease which is clinically of the 'paralysis-agitans type,' and pathologieally is associated with atrophy of the motor cells of the globus-pallidus mechanism. It is a pure system disease, an *abiotrophy*, in the sense in which this term was used by Gowers, and is characterized by a progressive degenerative atrophy limited to a definite system of neurons. In this respect it resembles primary lateral sclerosis and progressive muscular atrophy, and is another example of the vulnerability of the motor neuron. The affection is often familial, and is sometimes hereditary. It appears in the second or third decade of life, and, like other system diseases, perhaps even later.

Etiology.—This is unknown. The disease begins insidiously, and progresses slowly and steadily without apparent cause. Some cases have followed, or their course has been exaggerated by, the acute infectious diseases. In the third case in this series, syphilis had preceded the onset of the symptoms. Trauma has also been cited as an exciting cause. But here, as in the other forms of abiotrophy, we are in a mysterious field in which a primary biological weakness of the affected system of neurons, or an occult form of selective intoxication, probably plays the important rôle. In one of his cases there was consanguinity of the parents, which is so important a factor in the production of other forms of system disease.

Symptomatology.—This is comparatively simple, and is limited to a progressive paralysis, rigidity, and tremor in various combinations. It begins with rhythmical tremor and rigidity of an extremity, which then gradually extends to other portions of the body. The affection is usually bilateral, although there may be a unilateral predominance of the symptoms over many years. The paralysis, rigidity, and tremor have all the characteristics of paralysis agitans. In the early stage the tremor is often coarse, and may become violent

during emotion or motor activity. It is not of the intention type, gradually diminishes, and finally ceases as the movement reaches its termination. In advanced cases, the face, tongue, eyelids, and ocular excursions may be affected. The ocular tremor may then simulate closely a true nystagmus, and a spurious ankle-clonus may also be present. As the disease advances, the tremor usually recedes, and paralysis and rigidity become more prominent. The paralysis and rigidity are those characteristic of paralysis agitans. There is the rigid musculature, the mask-like expression of face, the slowness of movement, the lack of motor initiative, and the typical gait and posture so well described by Parkinson (*Fig.* 96). The paralysis, apart from the rigidity, involves essentially the automatic and associated movements. The affection is inclined to progress somewhat more rapidly than the late forms of paralysis agitans, and involvement of the bulbar muscles may occur comparatively early in the disease. In the last stage there is almost total rigidity of the entire voluntary muscular system.

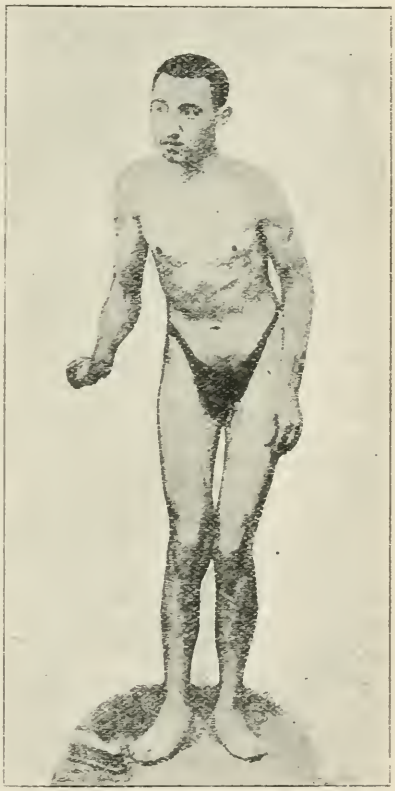


Fig. 96.—Progressive atrophy of the globus pallidus at the age of 17, two years after the onset of the disease. Note the attitude, position of hands and fingers, and the well-defined contour of the muscles (rigidity).

(From Dr. Wiener's Report.)

Diagnosis.—The diagnosis is not difficult. The early age of onset, the gradual progression, the Parkinsonian nature of the paralysis, rigidity, and tremor, produce a characteristic clinical picture. Distressing subjective disturbances—e.g., pain, numbness, sensation of heat and cold—so frequently met in the senile form, are absent.

In the early stage there may be a certain resemblance to multiple sclerosis, on account of the early age, the violent and extensive tremor, speech disturbance, pseudo-nystagmus, and a spurious Babinski reflex. Careful attention to the true nature of the tremor, and the elimination of spurious symptoms, will, however, render the diagnosis clear. The same holds true for primary spastic paraplegia, for which, on account of the early age of onset, the affection has sometimes been mistaken.

There may also be a certain resemblance to progressive lenticular degeneration, as both affections are often familial, and both are types of an extra-pyramidal motor disorder with paralysis, rigidity, and tremor of the Parkinson type. In Wilson's disease, however, the more rapid course, the general constitutional symptoms, fever, and emaciation, the mental disturbances, the hepatic cirrhosis, and especially the occurrence of choreiform and athetoid movements and muscular spasm, should be sufficient to render the diagnosis clear. These spasmodic phenomena do not occur in progressive atrophy of the globus pallidus, and, when present, should be regarded as an indication of more extensive involvement of the corpus striatum.

Prognosis.—The prognosis is absolutely unfavourable as regards cure, or even any considerable recession of symptoms. The affection, however, is but slowly progressive, and is compatible with many years of life.

Continuous Baths advised (p. 5).

Reference.—[1]*Brain*, 1917, xi, pt. i, 58.

PARALYSIS, INFANTILE. (*See* Poliomyelitis, Acute.)

PARATYPHOID FEVERS. (*See also* Typhoid Fever.)

E. W. Goodall, M.D.

An excellent description of the various forms of these affections from the clinical aspect is given by C. H. Miller[1] in the Goulstonian Lectures for 1917, of which the following is a summary of the most important points.

The lecturer points out that in paratyphoid, as in typhoid, there is a bacillæmia, so that it is possible for any part or parts of the body to be affected; but the paratyphoid bacilli have not the same limited affinity for the lymphatic tissue of the intestine as the typhoid bacillus; consequently there is a considerable variety of lesions, according to the parts or organs invaded. He refers to Stolkind's classification (*see* Medical Annual, 1917, p. 396), and then gives his own classification, as follows, based upon a study of 500 cases which came under his own observation: (1) The typhoid; (2) The dysenteric; (3) The biliary, i.e., jaundice and cholecystitis; (4) The urinary, i.e., nephritis, cystitis, etc.; (5) The rheumatic or arthritic; (6) The respiratory, i.e., bronchitis, pneumonia, and pleurisy; (7) The influenzal; (8) The septicæmic. But in putting forward this classification he is particular in pointing out that the typhoid is to be regarded as the parent type, and the others are the offspring: and that it is only in the initial stages that many of these varieties depart from the typhoid type.

1. *The Typhoid Type.*—This is the form most commonly met with, at any rate among the uninoculated. The incubation period is from twelve to twenty days' duration. A gradual onset is rather more frequent than a sudden. The chief initial symptoms are headache, loss of appetite, thirst, pains in back and legs, dizziness, insomnia,

shivering, fainting, vomiting, abdominal pain, diarrhœa, bleeding from the nose, cough, and some inflammation of the fauces. Later the patient becomes drowsy and apathetic ; his memory is defective, and he lies curled up in bed, wishing to be left undisturbed, and will, if asked, complain only of headache, most often vertical. In severe cases his condition is like that of a patient suffering from typhoid. Temperature is very varied. It does not seem possible to lay down rules in regard to either its rise, maintenance, or defervescence. But it often happens that if the temperature reaches its highest point quickly, the duration of fever is shorter than in other cases where the rise has been by gradual steps. The pulse is soft, easily compressed, often dicrotic, and relatively slow. In fact, slowness of pulse with a rising temperature is the most important of the early signs of paratyphoid fever. It has been noticed that if the pulse is frequent in the early days of the fever, the temperature may become high and the attack be severe. Arterial tension is low.

The rash appears about the end of the first week, and may present one of three different varieties. The most common is the roseola of typhoid—small pink macules and papules, mostly on the abdomen. The second variety may be regarded as characteristic of paratyphoid. It consists of larger spots of irregular outline, red with a blue tinge, raised, not fading completely on pressure, and leaving a freckle-like mark of pigmentation after they have disappeared. The third variety is rare. Cyanotic subcuticular patches of irregular shapes and sizes are sometimes seen in severe cases. These patches may be the only evidence of a rash, or they may be mixed up with the other forms. In the case of the second variety, especially, the rash may be so profuse as to give rise to the diagnosis of measles or rubella.

Sweating is much more common than in typhoid. It is prone to occur at night, and may be very profuse. Bronchitis is very common during the first ten days. Cardiac implication is rare.

The abdomen is usually moderately distended ; tenderness is often felt in the right iliac fossa. The spleen is enlarged (moderately) in most of the cases ; it may also be painful. The edge of the liver is lower than normal, and deep tenderness over the gall-bladder area is fairly common. In nearly all cases there is initial diarrhœa ; it lasts only two or three days, when it is succeeded by constipation. The stools may be 'pea-soupy.' Intestinal hæmorrhage is not very frequent ; it occurs in not more than 5 per cent of the cases at the outside, and is rarely severe.

Perforation is rare ; but the symptoms are more common which cause it to be suspected. The signs of appendicitis are fairly common. The author states that the frequence of appendicular symptoms is apparently a peculiarity of paratyphoid B. Peritonitis without perforation may occur. Boils and subcutaneous abscesses are common, especially in paratyphoid B. Other complications are rare.

Relapses occur in about 8 per cent of the cases ; and second and third relapses are occasionally met with. Convalescence is tedious ;

but as the disease has been observed by the author almost entirely in soldiers who have been on active service, it is a question how much convalescence is affected by other conditions. It is not uncommon to find cardiac dilatation and frequency during this stage; and an attack of paratyphoid may be the origin of a 'soldier's heart.'

2. *The Dysenteric Type.*—The author states that the term dysentery should be limited clinically to those cases in which there is a frequent passage of blood and mucus, accompanied by tenesmus. He discusses the question whether the paratyphoid organisms can cause dysentery. It must be borne in mind that mixed infections of true dysentery and paratyphoid are undoubtedly common. But in his opinion, which agrees with that of many observers, the paratyphoid organisms are very prone to attack the large intestine, and may set up ulceration therein, and dysenteric symptoms may be present. The dysenteric symptoms of paratyphoid are not different from those of amœbic and bacillary dysentery. A troublesome feature in some cases has been an intermittent spasm of the sigmoid.

3. *The Biliary Type.*—This appears to have been more common in cases from the Dardanelles; it was rare amongst those from Flanders. The symptoms are those of cholecystitis, with or without jaundice. Catarrhal jaundice has been met with quite early in the illness, or late, during early convalescence. It has a tendency to be recurrent.

4. *Nephritis and other Affections of Urinary Tract.*—Acute nephritis is fairly common. There is nothing peculiar in the symptoms; but they are usually very obstinate. They may occur quite early in the attack.

5. *The Rheumatic Type.*—The author uses the term 'rheumatism' in the popular sense; and this type includes cases chiefly of inflamed painful joints and muscles. There are three varieties: (*a*) Acute articular rheumatism (not common); (*b*) More common, a condition closely resembling the 'infective type of arthritis': besides swelling of joints there was great wasting of muscles, and the results of treatment were unsatisfactory; (*c*) The 'trench-fever type': painful tender shins, especially at night.

6. *Diseases of the Respiratory Tract: Bronchitis, Pleurisy, and Pneumonia.*—These are common; often due to secondary infection with other organisms, especially the pneumococcus. The paratyphoid bacilli apparently do not attack the pleuræ and lungs. The pneumonia may be lobar or lobular; if the latter, it is usually of the creeping variety.

7. *The Influenzal Type.*—Paratyphoid fever may closely simulate influenza, especially at the beginning of the attack. There are three varieties: (*a*) The respiratory: the onset is sudden, with rhinitis, pharyngitis, and often laryngitis; (*b*) The gastro-intestinal form: the onset is sudden, with nausea, vomiting, abdominal fever, and diarrhœa; (*c*) The nervous: onset sudden, with intense headache, irritability, and depression.

8. *The Septicæmic Type.*—This is seen most commonly in patients

who die early in the disease. No local lesions can be found post mortem, but only signs of an acute septicæmia.

The findings of a number of post-mortem records consulted by the author show that: (1) The lesions may be the same as in typhoid fever; (2) The large intestine is more commonly ulcerated than in typhoid fever; (3) The intestines may be acutely inflamed throughout their length, but the lymphatic tissue may escape; (4) There may be no change at all in the intestines. The mortality has varied in different series of cases from about 1 to 9 per cent. [It is, however, seldom higher than 3, according to most observers. There is a difference of opinion, according to individual experience, as to which is the more severe affection, paratyphoid A or B.—E. W. G.]

The author states that early in the disease it is impossible for the clinician to diagnose typhoid fever from paratyphoid, and the paratyphoids from each other. Then the diagnosis rests with the bacteriologist, especially by means of blood-culture.

TREATMENT.—Speaking generally, this is the same as for typhoid fever; but the following treatment, which was found useful in certain complications, may be noted. In *distention*: **Enemata, Calomel,** and **Pituitrin,** as peristalsis is assumed to be less dangerous than stagnation. In *dysenteric cases*: the treatment of diarrhœa is difficult: in mild cases, **Castor-oil** and **Chlorodyne**; in severe cases, **Opium** and **Astringents**; also washing out the colon with **Saline Solution** or **Boracic,** this to be followed by a starch enema. After the initial stage in these cases, a heaped teaspoonful of **Bismuth Carbonate** every morning is advisable; later, liquid **Paraffin.** In *collapse from diarrhœa*: fluid by mouth, by rectum, under the skin, and into the peritoneal cavity, the best method being the **Rectal Injection** given very slowly; also **Alcohol** and injections of **Camphor.** Strychnine is harmful and digitalin useless. For the *irritation of the skin in jaundice*: local applications; also, and particularly, the administration of **Thyroid Extract.** For freeing the *urinary tract* of infection: **Urotropine.**

The author has had no experience of **Vaccine** treatment; but from the records of other observers it would appear to be beneficial, though further experience is required. As a prophylactic measure, vaccine inoculation is to be recommended. There are, according to the author, two possible disadvantages. The first is, that the protection afforded so mitigates an attack that its nature may be unrecognized and even trivial, so that the patient becomes an undetected carrier. The second is, that a patient may happen to develop an attack of paratyphoid soon after inoculation, and, as his resistance is lowered, the infection may get the upper hand. [In my opinion this is a somewhat hypothetical objection, and the author admits that cases of this nature are very rare, and are of a very benign nature.—E. W. G.] The protection probably does not last for more than a year.

REFERENCE.—[1]*Lancet*, 1917, i, 747.

PEDICULOSIS CORPORIS. *E. Graham Little, M.D., F.R.C.P.*

Bacot,[1] by means of ingenious experiments with live lice confined in small gauze bags so that they could feed on the patient but could not escape from the bag, tested a number of remedies recommended from time to time for preventing pediculosis, including naphthalene, sulphur, cresylic acid, iodoform, vermi jelli (alone and combined with cresylic acid, and with phenol) cytisiné (alone and combined with iodoform and sulphur), and forms the conclusion that these methods fail when there is not actual contact of the agents and the lice, and reliability cannot be placed on diffusion or vaporizing of the preventive agent, with the possible exception of naphthalene, and this has the drawback that its effect speedily wears off, so that in two days at most its preventive action is lost. Cytisine has the further disadvantage that in the quantity required for impregnation to be preventive there is risk of toxic effects on the patient, which might be serious or even fatal. Bacot recommends the following method, of which he disclaims large practical experience of actual results, by which underclothing is impregnated with '**Crude Liquid Carbolic Soap**' and **Soft-soap Emulsion.** The emulsion should consist of 45 to 50 per cent of soft soap, which is combined by heating with 50 to 55 per cent of the crude carbolic. The strength of the solution used to impregnate the garments should be 5 per cent of the emulsion in warm water, 3 per cent being too weak for practical use; while solutions above 5 per cent might cause irritation to the skin. After dipping, the garments should be wrung and thoroughly dried before they are worn. A normal-sized flannel shirt after wringing will retain about 500 to 600 c.c. of the solution, and the cost, apart from labour, would probably be about one halfpenny per shirt.

Bacot[2] has an ingenious suggestion to determine the temperature of sterilizing chambers for the destruction of pediculi and their ova. He uses pots of a certain depth and area containing stearin of a melting point of 60°. Having experimentally established the fact that nits are killed by an exposure to 52° for fifteen minutes, under conditions approximating to that of nits infecting the clothing, he estimates the quantity of stearin which will melt in thirty minutes, and finds that 7 grms. are so required. If, therefore, a pot of that quantity of stearin is placed in the chamber, it may be assumed that the desired effect on the clothing has been obtained when the stearin is completely melted.

In a discussion of the louse problem in the army, opened by Bacot[3] at the Royal Society of Medicine, some interesting facts were noted. Under normal conditions—namely, in clothing that was constantly worn—eggs took seven to ten days to hatch; if clothing was discarded or allowed to cool for a period each day, the time might be extended to five weeks. Active lice could exist without food and apart from any host for periods up to nine days. Young lice took from ten to fourteen days to attain sexual maturity. Females, after attaining

maturity, required two to four days before they commenced to oviposit. Egg production could not take place without food or under cool conditions (below 65° F.). Eggs which were laid by unpaired females did not hatch. Impregnation was not effective for more than twenty days. As many as ten or twelve eggs a day might be laid by each female, and each might lay a total of 300 eggs. After reaching maturity the female might live for forty-six days, and before the close of her life a single female might have 4160 living offspring.

Nuttall adduced evidence to show that there was no morphological differentiation between pediculosis capitis and corporis, and they are to be treated as one infection. The methods of prevention and destruction of the pest were reviewed, and there was an agreed opinion that **Dry Heat** was the best destructive agent of the parasite in clothing, a temperature of 55° to 60° being required. Crude **Carbolic Acid** and **Cresol,** 5 to 10 per cent, emulsified with soap, were used to impregnate garments, and when so treated these would prevent the attacks for a short time (about fifteen days). **Naphthalene,** which is used largely by the Germans for this purpose, was found of value by some observers and condemned as useless by others. For the treatment of pediculi in the scalp, 5 per cent **Crude Carbolic Emulsion** should be used. Pediculi did not lay eggs readily on silk fabrics, and silk underwear was a measure of protection.

Gunn[4] recommends the impregnation of a light-textured fabric such as butter-muslin (to be used for vests and pants worn next to the skin) with a 1 per cent solution of **Sulphur and Naphthalene in Benzol.** If benzol is unprocurable, second-grade **Petrol** may be substituted, but is not quite as good a solvent. Probably the wearing of these impregnated garments is in some measure also a protection against the contraction of scabies.

Simon[5] found powdered **Pyrethrum Flowers** a very effective preventive, but the supply running short after some experiments, he devised the following formula diluting the original, and this was also very successful: camphor 10, naphthalene 10, ol. eucal. 5, pyrethrum to 100. Pyrethrum being finally unobtainable, the following formula was adopted, the efficiency of which is materially increased by the addition of pyrethrum, where procurable, in the proportion of one in three:—

℞	Turpentine (oleo-resin)	℥v	Oil of Cloves	℥iss
	Xylol		Naphthalene	℥iiss
	Oil of Cade		Kieselguhr	℥xvj
	Oil of Eucalyptus	āā ℥j		

This powder may be dusted over the hairy parts of the skin or worn in packets pinned to the shirt.

References.—[1]*Brit. Med. Jour.* 1916, ii, 447; [2]*Ibid.* 1917, ii, 151; [3]*Ibid.* i, 295; [4]*Ibid.* 579; [5]*Pract.* 1917, i, 293.

PELVIC INFECTIONS, SURGICAL TREATMENT OF,

W. E. Fothergill, M.D.

Cullen,[1] in the course of a valuable contribution, brings out certain points that deserve repetition. In removing a large pus tube, if the uterus is to be left, it is better to begin by excising a wedge of the uterine cornu and gradually freeing the mesosalpinx. The tube can then be lifted up and packed round before it is shelled off from the pelvic floor. This reduces to a minimum soiling by escaping pus.

Pelvic drains through the floor of the pouch of Douglas into the vagina should, if possible, be so placed that they do not come in contact with the small bowel. Drains of this kind should not, as a rule, be removed before the fourth or fifth day. If removed on the second or third day, and if they have been in contact with loops of small bowel, these drains may pull an adherent loop of bowel down into the

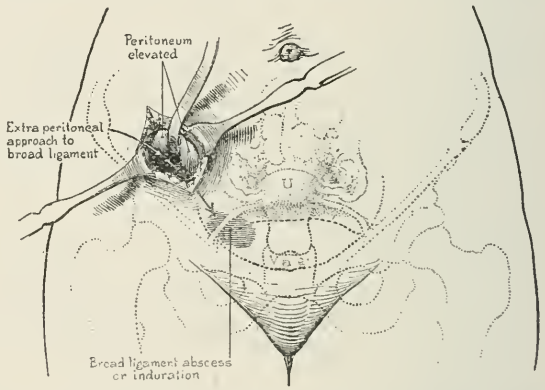


Fig. 97.—The easiest and most satisfactory avenue of approaching a post-puerperal cellulitic abscess. A gridiron incision is made above and parallel with Poupart's ligament, and the fascia and muscles are split as in an appendix operation. As soon as the peritoneum is reached, it is pushed toward the median line but without being opened. The two index fingers then gradually spread the broad ligament until the area of induration is reached. A little pus or watery fluid will then usually escape. A drain is carried down to the indurated area and the abdominal incision is partially closed. If both broad ligaments are thickened, an incision is made on each side. Post puerperal broad ligament indurations that have persisted for weeks will usually rapidly disappear after being drained in this manner. (*Reduced from 'Surgery, Gynecology, and Obstetrics.'*)

vagina. The vaginal drainage of a pelvic abscess may relieve the patient for the time being only. The development of other abscesses may demand repeated interference through the drainage opening, before final clearing, contracture, and healing of the cavity can take place. Further, a subsequent abdominal operation may be required.

No pelvic abscess cavity should be irrigated. There is a danger of rupture of the abscess wall, and escape of infective fluid, with general peritonitis, as a result.

Post-puerperal pelvic abscesses are found as a rule in the parametric tissue (pelvic cellulitis with suppuration). These abscesses can be most satisfactorily opened extraperitoneally through a grid-

iron incision just above Poupart's ligament (*Fig.* 97). Such accumulations should rarely, if ever, be opened through the vaginal vault. Other abscesses occupy the pouch of Douglas, with the uterus in front of them, their roofs being formed by matted omentum and loops of bowel (pelvic peritonitis with suppuration). These are quickly, simply, safely, and easily drained through the posterior vaginal fornix (*Fig.* 98). They push the rectum backwards and downwards,

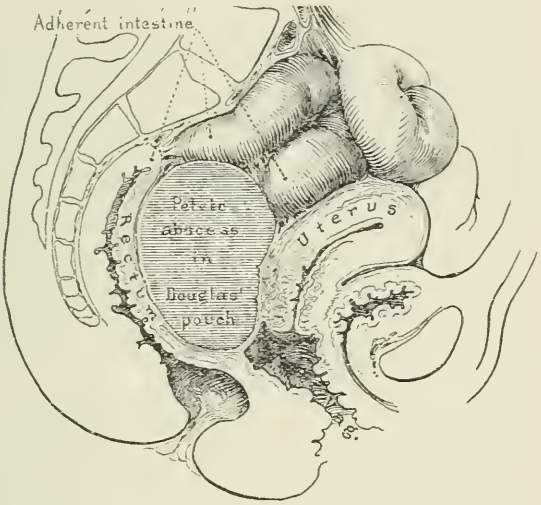


Fig. 98. — A pelvic peritonitic abscess. This abscess filled the pelvis and bulged slightly into the vagina. Frequently such an abscess encroaches markedly on the rectum. The distance between the abscess and the vagina is not over 2 or 3 mm. The proper route for its drainage is through the posterior vaginal fornix. (*Reduced from 'Surgery, Gynecology, and Obstetrics.'*)

so that the usual $\frac{3}{4}$ in. of vaginal wall between the cervix and the rectum and in contact with peritoneum is considerably extended. This renders the operation of posterior colpotomy very easy when its object is the opening of an abscess. (*See also* MEDICAL ANNUAL, 1917, p. 399.)

REFERENCE.—[1]*Surg Gyn. and Obst.* 1917, ii, 134.

PEMPHIGUS NEONATORUM. *E. Graham Little, M.D., F.R.C.P.*

Falls[1] had an opportunity of observing an epidemic of six cases of this disease in a maternity hospital, and of making full bacteriological experiments. The causative bacterium was demonstrated to be a staphylococcus indistinguishable from *S. pyogenes aureus.* Intravenous and intraperitoneal injections in rabbits and guinea-pigs resulted, not in the production of skin eruptions, but in the death of the animals. The writer was able to reproduce a typical lesion on his own skin by rubbing into it a pure broth culture of the organism, which was also recovered from the experimental lesion. The statement is therefore made with confidence that pemphigus neonatorum is a contagious disease of the skin occurring in infants and young children, and characterized by a vesicular eruption on various parts

of the body which may become bullous. The lesions are filled with a clear fluid in which a peculiar strain of the *Staphylococcus aureus* can be demonstrated by smears and cultures. "Epidemic staphylococcic vesicular dermatitis of the new-born" would be a preferable title. The disease appears usually in children from three to fourteen days old. Adults may contract it, but in them it runs a much more benign course. The sexes suffer equally. Climate has a most marked effect in incidence, for it is much commoner in tropical and warm countries, and is more frequent in hospital than in private practice. The mortality varies from nil to 50 per cent. It seems probable that the serious cases are really the result of a second infection, streptococcic in type. The prognosis depends on several factors, strong and healthy children having a much greater resistance than weakly infants; and the older the child the less likely is the disease to be grave. If the blebs have attained a large size and become confluent, prognosis is worse, probably being conditioned by the area of skin destroyed. Umbilical infection is a serious complication explaining some of the fatal instances, and accordingly cases with abdominal lesions are graver than where this portion of the body is free. If the mother shows symptoms of sepsis, the prognosis for the child is correspondingly bad; eruptions in very young infants associated with rise of temperature are almost always fatal.

Early diagnosis and isolation are of the utmost importance. Nurses should wear rubber gloves in applying the dressings, and a daily change of sterilized baby clothes should be practised. The lesions should be pricked with a sterile needle as soon as they make their appearance, and the surface dressed with 2 per cent **Ammoniated Mercury** ointment. A daily bath in 1–2000 **Bichloride** is recommended. **Vaccines** have been used with somewhat uncertain results, and the author would restrict their employ to prophylactic injections of those who may have been exposed to infection rather than in actual cases of the disease. Small doses—10 to 15 million—are recommended.

Reference.—[1]*Amer. Jour. Obst.* 1916, Dec., 1048.

PERICARDITIS. *C. F. Coombs, M.D., F.R.C.P.*

Etiology.—Robey's[1] studies based on post-mortem data go to confirm the view, which is now generally accepted, that pericarditis is an infective lesion. Like other American observers, he attributes less importance to the rheumatic infection as a causal factor than do British workers. The same is true of Locke,[2] who, like Robey, gives the first place to pneumonia as the causal lesion. The latter, however, attributes the relative insignificance of rheumatism as a cause of fatal pericarditis to the low mortality-rate of this latter infection.

Diagnosis.—It is no doubt the absence of pain, to which Robey calls attention, that is partly responsible for the large margin of error in the diagnosis of pericarditis. It was a prominent symptom in only one-third of his fatal cases, and if all be considered together, mild as well as severe, the percentage in which there is much pain is

indeed small. Locke's figures show that the presence of pericarditis was detected during life in only 17 per cent of those patients who showed evidence of the lesion post mortem. The characteristic friction sound may not be present even if carefully looked for, but it may be easily overlooked or misinterpreted.

Morris and Bader,[3] who have investigated the physical signs produced by injection of fluid into the pericardial sac of the cadaver, lay stress on the value of "retrosternal dullness, with increasing retrosternal shadow in röntgenograms," as a sign of pericardial effusion. Both Robey and Locke are impressed by the difficulty of discriminating between effusion into the pericardial sac and dilatation of the heart itself. This is in accord with the experience of British clinicians. Inasmuch as acute dilatation of the heart is far more commonly encountered than massive effusion into the pericardium, it is perhaps wise to decide in favour of the former in cases of doubt, relying on *x*-ray findings, the nature of the causal lesion, and careful exploratory puncture in a very few cases only, to save one from overlooking the presence of an effusion large enough to demand radical treatment. Locke particularly emphasizes the value of **X rays.**

TREATMENT.—**Epigastric Puncture** is a method of exploring and draining the pericardial sac which we owe to French clinicians.[4] The patient half sitting up in bed, a lumbar-puncture needle is inserted in the middle line immediately below the tip of the ensiform cartilage. The handle is then lowered so that the needle slants upward close to the inner side of the sternum, as if trying to shave it. When the point has been introduced to a depth of 4 cm. in a child, or 5 or 6 cm. in an adult, it should have entered the pericardial sac at almost its lowest point. This is of value not only as an exploratory method, but also for the evacuation of clear effusions. For purulent effusions **Incision with Drainage** is nearly always necessary. A good account of the literature is given by Camac and Pool,[5] who describe an unsuccessful case of their own, and suggest the use of **Autogenous Vaccines** to assist operative measures in overcoming the infection.

The operation of **Cardiolysis** is still performed occasionally in the hope of freeing the heart from the disabilities inflicted upon it by pericardial adhesions. Summers[6] records two unsuccessful cases, failure being due in each case to myocardial disease such as almost inevitably accompanies all cases of widespread pericardial adhesion.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* 1917, i, 529; [2]*Boston Med. and Surg. Jour.* 1916, ii, 590; [3]*Jour. Amer. Med. Assoc.* 1917, ii, 450; [4]*Paris Méd.* (*Jour. Amer. Med. Assoc.* 1916, ii, 546); [5]*Amer. Jour. Med. Sci.* 1917, i, 509; [6]*Surg. Gyn. and Obst.* 1917, ii, 92.

PERITONITIS, PUERPERAL. *W. E. Fothergill, M.D.*

Chassot,[1] of Geneva, describes the careful examination of nine fatal cases of puerperal pelvic infection with peritonitis. Pyosalpinx occurred in only one of the cases. In all the rest the infection reached the peritoneum by way of the uterine vessels, the lymphatics, and the parametrium. These observations confirm the opinion formed from

clinical observation that pyosalpinx is very rare in septic infection of the genital tract. Streptococci attack tissues and spread within them more readily than they spread on surfaces. Gonococci, on the other hand, propagate more freely on mucous surfaces. In cases of pyosalpinx developing during the puerperium the infection is thus often mixed or gonorrhœal. (*See also* SALPINGITIS.)

REFERENCE.—[1]*Cor.-Blatt. f. Schweiz. Aerzte*, 1916, Aug.

PERLÈCHE. *E. Graham Little, M.D., F.R.C.P.*

A. L. Smith,[1] examining 1211 children, found some degree of this condition present in 207. It is essentially an infection of the skin and mucous membrane of the lip, largely the result of licking the lips with the tongue (whence its French title), and is characterized by a maceration of the epithelium, associated with desquamation of the surface and more or less deep fissures. The anaerobic streptococcus was found in pure culture in 135 cases. The same organism was found 26 times in combination with the *Staphylococcus pyogenes aureus*, 7 times with the *Staphylococcus albus*, and 14 times in association with the *Streptococcus pyogenes*. In the later stages of the disease, the anaerobic streptococcus was not found at all, but the *Staphylococcus pyogenes aureus* was found alone 36 times, and was associated 3 times with the *Streptococcus hæmolyticus*. Thus, it seems, the anaerobic streptococcus disappears after the secondary infection.

The treatment recommended is to include measures to produce a diminution of the salivary secretion, and when this has been effected the parts should be painted with a 50 per cent solution of **Silver Nitrate** (taking care not to have too much on the applicator), and when dry apply Lassar's **Zinc Oxide Paste.** If the lesions do not disappear in a few days, **Spirits of Camphor** or **Alcohol** are applied. Should the flow of saliva not be decreased, tincture of **Belladonna** should be given internally until the physiological limit is reached. In four of the patients the lesions did not disappear after seven months of treatment by local applications, but when belladonna was given until the salivary secretions were reduced in amount, they soon healed. When pus infections are present, the crusts should be soaked with a 1–1000 solution of **Mercuric Chloride,** then removed, and the area covered with 5 per cent **Ammoniated Mercury** ointment.

Lane,[2] on a consideration of a much smaller number of cases, comes to substantially the same conclusions as those noted above. He uses a weaker solution of **Silver Nitrate,** 10 per cent, applied daily or every second day. A dilute tincture of **Iodine, Copper Sulphate,** and **Alum** are also advocated.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 1580; [2]*Ibid.* ii, 192.

PERNICIOUS ANÆMIA. (*See* ANÆMIA, PERNICIOUS.)

PERTUSSIS. (*See* WHOOPING-COUGH.)

PHTHISIS. (*See* Tuberculosis.)

PIGMENTATION OF THE GUMS. (*See* Gums.)

PLAGUE. *Sir Leonard Rogers, M.D., F.R.C.P.*

Etiology.—W. M. Philip and L. F. Hirst[1] record valuable data regarding the outbreak of plague in Colombo, 1914–16. The port remained free from the disease for eighteen years after India became infected. The first suspicion was aroused by a report of a number of sudden deaths in the chief grain centre, which investigation showed to be septicæmic plague. The most remarkable feature of the outbreak has been that throughout the two years reported on, the great majority of the cases have been septicæmic, and very few bubonic. Moreover, the epizootic in rats presented the same feature to such an extent that the naked-eye changes on dissection, which are relied on in Bombay so largely for detecting the disease in rats, were useless in Colombo, where the organisms could be easily detected by microscopical examination of the blood of the dead rodents. In the human cases no less than 193 out of 202 verified post mortem were of the septicæmic type. No enlargement or even tenderness of the glands could be detected during life in such cases, which could only be recognized by bacteriological methods. The patients were taken ill suddenly, a feeling of tightness and oppression of the chest being an early and prominent symptom, while death usually took place within twenty-four hours. The inhabitants of the poorer and more insanitary houses with rat-infested earth floors were chiefly attacked, and four-fifths were male subjects. The maximum season was in the cooler months of December and January, with a mean minimum temperature of 72°, while a rise to above 81° lessened the incidence. Segregation of cases and disinfection of their houses were chiefly relied on. An attempt to introduce inoculation with Bombay vaccine led to a panic and a threatened labour famine, so it had to be abandoned.

The Tenth Report on Plague Investigations in India[2] contains a long account of epidemiological investigations in the United Provinces of Agra and Oudh, which was carried out by T. H. Gloster and F. N. White in 1911–12, but has only now seen the light. They found that Cawnpore suffered much more than Lucknow, because the former is a greater trade centre, especially as regards grain; it is more rat-infested, and the number of fleas per rat is higher than in Lucknow. In a similar way they compared the high prevalence of plague in the Ballia district to the east of the province with the low rate in Bundlekund to the south-west, and found that the former is moister and cooler than the districts of the latter area, while the former also has more trade, especially in grain. In the drier area they found plague more prevalent in comparatively moist years, and in two other much-affected districts they noted that unusual humidity during the winter months was associated with severe epidemics. In the same report is a paper by St. J. Brooks on the influence of the saturation deficiency

and of temperature on the course of the epidemic, in which he considers the well-known fact that a mean temperature of over 80° checks plague epidemics, and he finds this is especially the case if the saturation deficiency is over 0·3 in., but with a mean temperature of 70° such a saturation deficiency does not check the disease.

J. W. Cornwall and T. K. Menon[3] have investigated the possibility of the bed-bug transmitting plague. They find that the bacillus multiplies in the insects fed on septicæmic plague patients, and may survive the infection for as long as thirty-eight days, but the insects often die of this and other bacterial infections, and, if they survive, the bacilli tend to die out in them. The organisms cannot regurgitate from the stomachs of the bugs, but may remain alive in their probosces long enough to infect an animal bitten within a few hours of the insect being infected from a plague patient. They conclude that the likelihood of human plague being transmitted by bugs is small.

Treatment.—S. R. Iyer[1] reports promising results in plague from the intravenous injection of 5 to 7 min. of **Tincture of Iodine** once or twice a day.

References.—[1]*Jour. Hyg.* 1917, Feb., 527; [2]*Jour. Hyg.* (*Plague Suppl.* v), 1917, May; [3]*Ind. Jour. Med. Research*, 1917, July, 137; [4]*Ind. Med. Gaz.* 1916, Oct. 16, 371.

PNEUMONIA. *Arthur Latham, M.D., F.R.C.P.*

Rufus Cole[1] says that the mode of infection in pneumonia is not properly understood, and without this knowledge effective preventive measures cannot be instituted, and the treatment as at present carried out has but little effect on the outcome. The matter, however, he points out, is not quite so hopeless as it seems, since new facts are being discovered, and it is probable that the time is not far distant when definite improvements in methods of prevention and cure may be made effective. Most cases of lobar pneumonia are caused by pneumococci. Previously it was thought that these pneumococci are all identical, but it is now known that there are at least four types of the organism. Over 500 cases of pneumonia have now been studied for the purpose of determining the relative frequency of the different types of infection. The results show that 60 to 65 per cent of all cases were due to pneumococci of Types I and II, 10 to 15 per cent to pneumococci of Type III, while the remaining 25 per cent were due to pneumococci belonging to Type IV. Studies have also been made to determine the frequency of occurrence of the different types in the mouths of normal persons. Of 527 examined, pneumococci were present in the mouths of 254, or about one-half. When pneumococci were present they were of the atypical, or Group IV variety, in about 75 per cent of the cases. In 17 per cent the pneumococci were of Type III, while on the other hand, in a very small number of cases, altogether less than 12 per cent, they were of the so-called fixed types, Types I and II. Moreover, in practically all the instances in which organisms of these fixed types were found in normal mouths, it was

possible to trace a close association between the person harbouring them and a case of pneumonia of the same type. These pneumococci of Types I and II also tended to disappear from the mouth after a short time, just as they do after convalescence from pneumonia.

The interpretation of these facts seems to be that pneumonias due to pneumococci of Types I and II are to be considered as specific infectious diseases, just as are typhoid and paratyphoid fever. In these forms of pneumonia, infection occurs by transference of the organism from a previous case, either directly or through the mediation of a healthy carrier. In pneumonia due to organisms of Type IV, infection is probably autogenous. The interpretation of the conditions as regards pneumococci of Type III is difficult. These are organisms of high virulence, yet are quite widely distributed in healthy mouths, and, so far as the author and other investigators have been able to learn, there are no differences, immunologic or otherwise, between the organisms of this type found in healthy mouths and those found in disease. It is evident that isolation of the cases due to pneumococci of Types I and II should be more strictly observed than has previously been done. With our present knowledge it is not possible to have an opinion as to whether isolation of cases due to pneumococci of Type III would be of any value or not. So far as infection with Type IV is concerned, isolation would probably have no effect.

While the matter of type differences is of importance as regards epidemiology and prevention, it is of still greater importance, he says, when we consider the matter of specific cure. Treatment may be carried out in one of two ways. Use may be made of so-called immunity reactions, or drugs having specific harmful action on the invading bacteria may be employed. The only drug of the latter kind we possess is **Optochin.** The use of the immunity reaction to hasten recovery may be made in one of two ways. First, we could attempt to stimulate the infected organism itself to produce the immunity reaction more rapidly, and to a greater extent, than would naturally be the case under the influence of the infection alone. The only method for doing this at present would be by the administration of **Vaccine,** but the author's own studies and experience convince him that little can be hoped for from this method in an acute disease like pneumonia. The second method by which immune reactions might be made helpful is by the administration of the **Serum** of animals rendered immune to this disease, and this had been the method which the authors have employed. On account of the specificity of types it is manifestly necessary to determine in each case the type of infecting organism before serum treatment can be commenced. The authors now have a method for doing this, and while laboratory facilities are necessary, and for each case a mouse must be sacrificed, the method is not difficult, and can be carried out in any well-equipped clinical laboratory. Moreover, from the standpoint of prognosis alone such a determination of type is of great importance. Immune

horse sera have now been prepared against the three important types, I, II, and III. The serum against pneumococci of Type I is of high power; that of Type II is considerably less powerful, while that of Type III has very little effect, either in the test-tube or in experimental animals. So far no attempt has been made to treat patients with Type III infection with serum. A limited trial has been made with serum of Type II in corresponding cases, but the results have not been promising. The use of immune serum against infection with organisms of Type I, however, has given very gratifying results, and experience indicates that with proper use this serum has great therapeutic value. In the hospital of the Rockefeller Institute, 78 cases have now been treated, with 6 deaths, a mortality of 8 per cent. When this is contrasted with the mortality of 25 per cent which was observed in the cases due to Type I infection before the use of serum was commenced, and the mortality of 25 to 30 per cent in this type of infection in other hospitals where determination of type had been made, it is evident, so far as can be judged from this number of cases, that the serum is of considerable value. The results are more striking when one takes into consideration the fact that of the 6 fatal cases, 1 died on the fifty-third day following pneumonia from a general streptococcus infection, 1 died during convalescence from a pulmonary embolism, 3 were treated only on the day of death, late in the disease, leaving but 1 case that received treatment over two days, and that could be said, with our present knowledge, to have been fairly efficiently treated.

In order to obtain the best results, certain rules must be observed. First, serum must be given in large amounts. It must be given intravenously, its administration must be commenced as early as possible in the disease, and its use must be continued until infection has been definitely overcome. It is a mistake to wait until late in the disease before administering the serum, or to give one dose of serum, then wait until the disease has gained great headway, and then make another abortive attempt. Before administering the serum a small dose of normal horse serum should be given subcutaneously in order to desensitize the patient in case he may be sensitive to horse serum. Among the treated cases the incidence of empyema has been greater than in the untreated ones. This probably means that in a certain number of the cases, otherwise fatal, the infection, instead of becoming general, was localized, and empyema resulted. This corresponds to what was known of the course of infection in practically immunized animals. Clinical experience suggests that the serum has some antitoxic action, but methods for demonstrating this are at present unknown. The fact that this serum is effective makes it theoretically possible that refinements in technique and improvements in the method of producing the serum may also later make the immune serum effective in infections due to the other fixed types.

Lobar Pneumonia.—E. Becher[2] states that **Optochin** (ethylhydrocuprein) was given orally in doses of 0·25 grm. every four hours in

twenty cases of pneumonia, with good results. When the drug was given on the first day of the disease the temperature fell, on the average, in two and a half days. Each day's delay in using the drug meant a longer period of fever. No ill effects were noticed beyond slight tinnitus and, in two cases, vomiting. R. Stübner,[3] who used the **Hydrochloride of Optochin,** considers that a dose of 0·25 grm. every four hours is too large, and that 0·2 grm. must be given with caution, and its use at once stopped if tinnitus or other toxic symptoms appear. He finds that the temperature level is reduced in two days by the use of the drug, and that it alleviates both dyspnœa and delirium. On the other hand, optochin has no good effect in a number of cases of pneumonia, and in some its use may be definitely harmful.

Alan M. Chesney,[4] using Wright's observation that the blood serum of patients who were given optochin became bactericidal for pneumococci, concludes that this effect of the drug is best secured by giving 0·024 grm. per kilo of body weight every twenty-four hours, and by making the initial dose a large one. He recommends for a patient of average weight an initial dose of 0·45 grm., with 0·15 grm. at three-hourly intervals on the first day, and 10 doses of 0·15 grm. on the second day. He collected 204 cases treated on or before the third day, with a mortality of 5 per cent, as against 119 cases treated after the third day, with a mortality of 21 per cent.

References.—[1]*Med. Rec.* 1917, i, 85 ; [2]*Med. Klin.* 1916, Oct. 29 ; [3]*Ibid.* Dec. 3 ; [4]*Med. Rec.* 1917, i, 87.

PNEUMOTHORAX. *Arthur Latham, M.D., F.R.C.P.*

Spengler, reporting on 82 patients operated upon previous to 1909, gave 15 instances in which there had been complete absorption of the pneumothorax for more than nine months, disappearance of fever, cough, bacilli, and expectoration, and resumption of normal work. Zink reports 31 out of 110 in which the patients were fully capable of work, and 9 clinically cured. A. B. Shortte[1] gives statistics and his own experience. He had 104 cases, but the operation was only possible in 79. Of the inoperable cases, only 2 (or 8 per cent) are working, and only 1 (or 4 per cent) is improved, while of the patients operated upon, 22 (or 28 per cent) are working and 19 (or 25 per cent) are in a good condition of health.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1916, ii, 1268.

POISONING, GAS. (*See* Gas Poisoning.)

POISONING BY MERCURIC CHLORIDE.

Herbert French, M.D., F.R.C.P.

It has long been known that mercury, when introduced into the body, produces characteristic changes. Applied locally, necrosis and sloughing are produced. In the body, practically every organ is affected, the secretory and excretory organs bearing the brunt of the damage. The drug produces a cloudy swelling, leading to fatty

degeneration and necrosis, frequently to hæmorrhagic inflammation associated with œdema. Classical symptoms of mercurial poisoning are : Burns, as in the mouth and vagina ; stomatitis ; nausea ; and vomiting ; oliguria, with blood, pus, and all forms of casts in the urine, or anuria ; anasarca ; abdominal distention ; and hæmorrhages from the mouth, nose, uterus, kidneys, and intestine. As the condition progresses, the patient enters into a state of muttering delirium, convulsions, coma, and finally death.

The most successful report of the treatment of mercurial poisoning is that of Lambert and Patterson,[1] who in a series of 16 cases had but 2 deaths. Their treatment is decidedly vigorous, but apparently has been successful. They **Wash out the Stomach** twice daily, and also give two **Colonic Irrigations** daily. They order the patient a **Liquid Diet** of 8 oz. of milk every two hours, to be alternated every two hours with 8 oz. of the following mixture : Potassium bitartrate 1 dr., sugar 1 dr., lactose ½ oz., lemon juice 1 oz., boiled water 16 oz. To supplement this large amount of fluid given by mouth, they prescribe a solution containing 1 oz. of potassium acetate to a pint of water, continuously per rectum. The approximate amounts are not mentioned. The patient also receives a daily hot pack.

It is a known fact that patients poisoned with mercury die with all the symptoms of acute nephritis. The evidences we get of acute nephritis are merely an indication of what is going on throughout the body. Just as the kidneys are swollen, so are the other tissues. When we find albumin, casts, and blood in the urine, we may be reasonably sure that the other organs have undergone damage similar to the kidneys—that is, severe cloudy swelling.

H. B. Weiss[3] advocates the following treatment, which begins on the arrival of the patient, usually within a few hours after the drug has been taken. The stomach is washed with 1 quart of milk and the white of three eggs, followed by water. A sample of gastric contents is saved for examination. Before the stomach tube is removed, 3 oz. of magnesium sulphate in 6 oz. of water are introduced and allowed to remain in the stomach. The patient is then given a soapsuds enema. The enema and catharsis rapidly open the gastro-intestinal tract, thereby aiding in the elimination of mercury. If the patient did not vomit immediately after swallowing the poison, and did not reach medical aid for at least three hours later, an intravenous injection of **Fischer's Solution** (sodium carbonate crystals 10 grms., sodium chloride 15 grms., water 1000 c.c.) is given at once in amounts ranging from 1000 to 1500 c.c., depending on the condition of the heart of the patient. If there is no evidence of cardiac derangement, 1500 c.c. of fluid intravenously are readily tolerated without any disturbance. Then the patient receives from 6 to 8 glasses of imperial drink a day, and he is given large quantities of water by the mouth. He is allowed a liberal diet—almost anything except an excess of protein foods.

He uses the analysis of the urine as the control of the treatment. The patient should void large quantities of urine, as he is taking large

amounts of fluid. He endeavours to keep the urine alkaline to a saturated solution of methyl red in alcohol, for Fischer has shown that if the urine of a nephritic cannot be made alkaline to methyl red, the patient continues in a dangerous state. Almost all of the patients develop an albuminuria early, but this gradually, or occasionally rapidly, disappears as soon as sufficient alkali can be introduced into the body.

Up to the present Weiss can report on 15 cases personally treated, and 10 cases similarly treated in other parts of his hospital. These 25 patients were discharged from hospital free from any discoverable symptoms of mercurial poisoning. There were no fatalities. The amounts taken by these patients, according to their own statements, varied from 3 to 82 gr. of mercuric chloride, all by the mouth.

REFERENCES.—[1]*Arch. Int. Med.* 1917, Nov., 865; [2]*Jour. Amer. Med. Assoc.* 1917, i, 1618.

POLIOMYELITIS, ACUTE. *J. Ramsay Hunt, M.D.*

The great epidemic of poliomyelitis which occurred in the United States during the summer of 1916 was fortunately not repeated the following year (see MEDICAL ANNUAL, 1917). A detailed account of the epidemic, as observed in New York State, with its 13,164 cases and 3331 deaths, will be found in the monograph[1] published under the direction of the New York City Department of Health. This embodies practically all that was learned from the study of this vast material from the standpoint of etiology, pathology, symptomatology, and treatment. Its perusal will show that while we have gained a broader knowledge of the symptomatology and more exact methods of treatment, the etiology and mode of transmission are still obscure, and those who have investigated the bacteriology of the affection are by no means in agreement.

ETIOLOGY.—Rosenow, Towne, and Wheeler[2] have shown by the use of special methods that the specific localizing power of bacteria is an important factor in the etiology of various diseases, including those of the nervous system. A re-investigation of the bacteriology of poliomyelitis by the newer methods being therefore felt to be desirable, a bacteriological study of the throat, tonsils, blood, spinal fluid, the central nervous system, and other tissues in cases in the present epidemic, was made, both in Rochester, Minn., and in New York City, with particular reference to the infecting power of the bacteria isolated. The exact relation of these authors' results to the facts already established as to etiology cannot yet be definitely stated. It appears to them, however, that the small filterable organism which has been generally accepted as the cause of poliomyelitis may be the form which this streptococcus tends to take under anaerobic conditions in the central nervous system and in suitable culture mediums, while the larger and more typical streptococcic forms, which investigators have considered contaminations, may be identical organisms grown larger under suitable conditions.

Ludwig Hektoen[3] reviews the results of certain recent investigations into the bacteriology of acute epidemic poliomyelitis. Heretofore the bacteria obtained from poliomyelitis have been regarded as contaminations or as secondary invaders. In the present case it seems that the first possibility may be dismissed from consideration. As to the alternative possibility indicated, it is safe to say that were it not for the remarkable effects of the coccus on the nervous system of monkeys and rabbits, its filterability, and its resistance to glycerol, it would have been promptly classed as a typical secondary invader and probably given only scant further notice.

Experimental studies in the etiology of acute epidemic poliomyelitis were also carried out by Nuzum and Herzog.[4] From cultures of the brain and cord in nine cases examined, a Gram-positive micrococcus was obtained in pure culture. From a careful study of rabbit inoculations it seems fair to conclude that the organism isolated can give rise to a flaccid paralysis in rabbits which resembles acute poliomyelitis clinically, but histologically differs from human poliomyelitis in that no perivascular infiltration is present, and that the types of infiltrating cells are probably not lymphocytes. Repeated injections of this micrococcus into guinea-pigs have thus far failed to produce any paralysis. In the monkey it has been possible to produce typical acute poliomyelitis even with relatively old cultures of the microorganism.

Nuzum[6] reports the bacteriological findings of the cerebrospinal fluid in poliomyelitis. From a series of fifty cases of typical epidemic poliomyelitis in the Cook County Hospital, the cerebrospinal fluid was obtained by lumbar puncture during life under sterile conditions. Control cultures were made. In no case was the peculiar microorganism characteristic of poliomyelitis obtained. He believes that the isolation of the organism from the spinal fluid may ultimately prove a valuable routine procedure in doubtful cases, and cites a number of case histories in support.

Diagnosis.—According to Zingher,[7] the important symptoms of early cases are fever, hyperæsthesia, slight rigidity of the neck, with pain on forward traction, and occasionally a slightly positive Kernig's sign; muscular tremors, noticeable especially in the fingers and hands, but also apparent in the entire extremities; weakness of the limbs, especially of the lower extremities, with early diminution or loss of the patellar reflexes; headache; nausea, vomiting, and constipation or diarrhœa; and the character of the spinal fluid obtained by lumbar puncture.

The cerebrospinal fluid, with a few exceptions, is quite characteristic even in the early stages of the disease. There is a distinct increase in the total number of cells, from 20 to 600 or more. These cells are mostly lymphocytes, with a small proportion of large mononuclear and polynuclear cells. During the earliest stages of the disease there may be a transient relative and absolute polynucleosis. There is an increased amount of albumin, globulin, and a substance

which reduces Fehling's solution. The diagnosis in a large percentage of cases can be established during the acute stage of the disease, even before the laboratory examination of the spinal fluid, by noting a slight but characteristic opalescence in the fluid, which gives a ground-glass appearance throughout the fluid when it is examined in a clean test-tube by transmitted light. This appearance is caused by the increased number of white blood cells (lymphocytes), which can be distinctly seen with the naked eye, and still better with a pocket magnifying lens.

It is often important to establish the diagnosis of the later stages of the disease, when no paralytic phenomena have appeared after the attack. A simple and yet fairly accurate way of diagnosing such cases is to remove the spinal fluid by lumbar puncture and examine its albumin and globulin content. For a period of from eight to ten weeks, a majority of persons who have passed through an attack of poliomyelitis will show an increased amount of both these substances. This is strongly suggestive of an attack of the disease during an epidemic, especially with a history of some or all of the preparalytic symptoms of poliomyelitis.

In addition to the ground-glass appearance of the fluid, there is a second macroscopic test, of value both early and late in the disease. This is the so-called foam test, and depends on the pathologically increased amount of albumin and globulin in the spinal fluids in cases of poliomyelitis. When a test-tube which is half filled with spinal fluid is thoroughly shaken, a persistent foam appears on the surface, which may last for half an hour to an hour or even longer. Compared with a normal spinal fluid, the foam produced by shaking a fluid obtained from poliomyelitis patients is much denser, finer, more voluminous, and more persistent. The presence of blood must be excluded before any definite deductions from this test are made.

Treatment.—The diagnosis in the early cases having been established by clinical symptoms and examination of the spinal fluid, Zingher's next step is to administer **Serum** into the spinal canal. Fifteen c.c. of the serum are injected by the gravity method after the removal of a slightly larger amount of spinal fluid. The dose is repeated every twenty to twenty-four hours until two or possibly three injections have been made. In the more severe cases, and especially with an advancing involvement of the respiratory muscles, the serum should be given every twelve hours.

The immune serum was obtained from convalescents and from immune donors who had had the disease from one to several years previously. The blood is allowed to clot, and the bottles are placed in the ice-box twenty-four hours to allow a separation of the serum. This is decanted the following day, and centrifuged to free it from pieces of blood clot and red blood cells. To the serum is next added a preservative in the form of 0·2 per cent. trieresol. This is added in a 25 per cent solution in quantities of 4 c.c. to every 500 c.c. of serum. The serum is then allowed to remain in the ice-box for

forty-eight hours, so that a fine precipitate, which forms after the addition of the tricresol, separates out and is removed. The serum is then passed through a Berkefeld stone filter, either by suction or by pressure, bottled in quantities of 15 c.c. in dark amber or blue bottles, and kept cold in the ice-box. The tricresol was found to increase the local irritant effect of the serum, and it may be advisable not to add it as a preservative.

The most evident action of the serum was a marked cellular response of the cerebrospinal meninges in the presence of the serum injected by lumbar puncture. This reaction consisted of a very decided increase of the polymorphonuclear cells, which preponderated in some of the cases to the extent of 95 per cent, while the total cell-count increased from 500 to 10,000 cells per cubic centimetre. Clinically, the injection of immune or normal human serum was followed within twenty-four hours in the early pre-paralytic cases by an intensification of the meningeal symptoms. There were increased rigidity of the neck, opisthotonos, marked Kernig's sign, hyper-irritability, headache, vomiting, and increased temperature, which in the most severe reactions reached 104° or 105°. At times, when the reaction was especially severe, there were twitchings or even convulsive movements of the extremities. These symptoms represented merely a more severe degree of the early pre-paralytic phenomena.

The following table gives a summary of the cases treated with immune and with normal human serum. It is interesting that, of 54 pre-paralytic cases treated with immune serum, 44 remained free

Institution	Pre-paralytic					Paralytic			
	Cases	No paralysis	Paralysis with Final Recovery		Died	Cases	Recovered		Died
			Complete	Partial			Complete	Partial	
a. Treated with immune human serum :— ..									
Willard Parker Hospital..	25	24	—	1	0	88	5	45	38
Minturn Hospital ..	15	9	3	3	0	18	2	13	3
With other physicians ..	14	11	2	1	0	13	1	8	4
Total	54	44	5	5	0	119	8	66	45
b. Treated with normal human serum :—									
Willard Parker Hospital	10	9	—	—	1	33	4	28	5

from paralysis, while of the 10 who developed some form of paralysis, 5 made a complete final recovery. The results with normal serum seem to be very favourable, but the number of cases is too small, and a larger series should first be treated before final deductions are made.

The high mortality among the paralytic cases is explained by the desperate condition of many of the patients at the time the treatment was administered.

A comparison of several methods of specific early treatment of acute anterior poliomyelitis was made by Helmuth Ulrich[8] in 120 cases of the disease. They were divided into six groups: Group I was treated with three intraspinous injections of immune serum; Group II was treated similarly with normal serum; Group III cases were injected with their own spinal fluids (autotherapy); Group IV comprised cases on which the effect of simple withdrawal of spinal fluid was tested; Group V received no specific treatment. The results recorded were nearly all observed at the end of six weeks, when most of the patients left the hospital, and showed no apparent difference in the various series. None of the measures used had any favourable influence whatever.

Whether or not treatment instituted before the appearance of paralytic symptoms is useful, remains to be determined.

In conclusion, Ulrich says that not only must the various measures employed in this study be looked upon as useless, at least after the onset of paralysis and under the conditions in which the investigation was carried out, but the manipulation of the sufferers necessarily attendant upon lumbar puncture causes great pain, and would seem to be harmful in view of the great need of rest during the early stage of the disease.

The intraspinal injection of **Adrenalin Chloride,** as advocated by Meltzer, was tried in 77 cases by P. M. Lewis[9] with gratifying results. Intraspinal pressure, if it was present, was relieved, and then 2 c.c. of adrenalin (1–1000 sol.) were injected. The injections were given every six hours, day and night, until the temperature had remained normal for forty-eight hours. In the cases with respiratory involvement it is best to give the injections with the patients in the lateral prone position, for to put them face down embarrasses the respiration, and marked cyanosis follows. Should this occur, the condition may be relieved by the administration of oxygen. [The favourable influence of this remedy is supposed to depend upon contraction of the blood-vessels, thus lessening the œdema, congestion, and hæmorrhage of inflammatory reaction. The experimental data upon which Meltzer[10] based his advocacy of this method of treatment are suggestive, although of a rather fragmentary nature.—J. R. H.]

Lovett[11] presents an analysis of 1836 cases of infantile paralysis observed in the poliomyelitis clinics of the New York State Department of Health. The conclusions reached seem to show that weight-bearing exercise, such as walking, in the first year after infantile paralysis, is attended with risk, and is followed in many instances by a change from partial to total paralysis in the foot muscles, whereas in other parts of the body this deterioration did not occur. The evidence of these studies is also definitely to the effect that the right hand recovers much more effectively than the left, which may be

interpreted as showing that the use of non-weight-bearing exercise is beneficial. He believes that the weight-bearing use of the muscles, with or without braces, in the first year following infantile paralysis involving one or both legs, is risky and detrimental if practised to any considerable extent, and that by the use of non-weight-bearing therapeutic muscular exercises, conjoined with little or no walking, in cases affecting the leg, it is possible to secure favourable results with which he had been previously unfamiliar.

The After-care of Infantile Paralysis.—The problem of the treatment of the convalescent stages of infantile paralysis, according to Robert W. Lovett,[12, 13] is definite, specific, and undisputed. It is to restore the maximum ultimate efficiency to affected muscles. The treatment of the acute stage of the disease has made great strides of late. Meddlesome therapeutics in the way of drugs, counter-irritation, and massage in the tender stage have been largely abandoned, the general practitioner is guarding against and preventing unnecessary deformity, and rest is being recognized by the intelligent physician as the best treatment at this time. In the later stage, too, an adequate and rational plan of operative treatment has been developed and is being practised by most orthopædic surgeons; but in the convalescent stage, which may be assumed as lasting for about two years from the time when the tenderness disappears, little real change has been made in our methods.

There are three therapeutic measures addressed directly to securing muscular improvement, **Massage, Electricity,** and **Muscle Training.** The third of these measures, is, in Lovett's opinion, the keynote of modern treatment of infantile paralysis. It is an application of physiology and anatomy to compensation for a pathological lesion. Every muscle is connected with several nerve centres, every nerve centre controls more than one muscle. The predominance of partial paralysis shows that partial rather than total destruction of nerve centres occurs in nine out of ten instances. The method advocated attempts to send an impulse from brain to muscle by establishing through such partially destroyed centres a new route which it tends to find for itself by constant repetition of attempted muscular contraction. Not only is the opening of new paths for efferent impulses highly desirable, but also the repeated contraction of each weakened muscle is of therapeutic value. The order is given to use a certain muscle, and, if necessary, the patient is aided by the surgeon in performing the prescribed movement. This is repeated several times at intervals of a few seconds, but never to the point of fatigue. In the stronger muscles the movement should be performed without assistance, by putting the limb in a position which gives a favourable leverage for the motion. Muscle training is harmful if inaccurately carried out, because a child inevitably tries to use the strong muscles in any movement rather than the weak, and if they are continually exercised they become stronger, while the weak remain as they were, and the muscular balance is made worse and

deformity results. A knowledge of functional anatomy is required on the part of one who prescribes the exercise. This required knowledge is not, as a rule, possessed by the ordinary masseur or masseuse, and the formulation of the exercises must be done by the physician or by a highly-trained assistant.

The requirements of the modern treatment of the convalescent stage of infantile paralysis may be summarized thus: An accurate muscular diagnosis is an essential pre-requisite to treatment. No active treatment should be begun until tenderness has disappeared. The upright position with restricted walking has certain advantages over prolonged inactivity in suitable cases. Fatigue is dangerous. Braces are conservative and protective—not therapeutic. Massage, electricity, and muscle training are the measures in general use to bring about improvement in muscles. Of these, the last named rests on the best physiological and pathological basis, and must be carried out with great accuracy to be effective.

REFERENCES.—[1]*Lancet*, 1917, ii, 28, 131; [2]*Jour. Amer. Med. Assoc.* 1916, ii, 1202; [3]*Boston Med. and Surg. Jour.* 1917, i, 687; [4]*Jour. Amer. Med. Assoc.* 1916, ii, 1205; [5]*Ibid.* 1434; [6]*Ibid.* 1437; [7]*Ibid.* 1917, i, 817; [8]*Boston Med. and Surg. Jour.* 1917, ii, 78; [9]*Med. Rec.* 1916, ii, 540; [10]*N.Y. Med. Jour.* 1916, ii, 337; [11]*Jour. Amer. Med. Assoc.* 1917, ii, 168; [12]*Med. Rec.* 1916, ii, 705; [13]*Jour. Amer. Med. Assoc.* 1917, i, 1018.

POLYNEURITIS, ACUTE FEBRILE. *E. W. Goodall, M.D.*

An account of this disease, which has been known as 'infectious polyneuritis,' has recently been published by Gordon Holmes,[1] from an experience of a dozen cases met with in soldiers in France in the winter of 1916–17, and of several cases seen in London some years ago. Holmes does not bring forward evidence in favour of infectiousness, but states that cases of the disease have often been observed in irregular epidemic form, generally during the winter, but they also occur sporadically. There is no reason to suppose that the disease is more common in the army than in civil life, nor that war conditions in France had anything to do with its causation.

SYMPTOMS.—The onset is usually rapid, with general malaise and fever, and a temperature of 100° to 103°. On the second or third day follow persistent pains in legs and lower part of back, increasing weakness of legs, and afterwards, though less severely, of arms; the face becomes 'drawn' or 'stiff,' speech is unnatural, and swallowing difficult. The maximal development is usually reached within a week from the onset. The symptoms then are as follows: The lower limbs extensively paralyzed; muscles flabby and toneless; no muscles completely, but all uniformly, affected; little, if any, atrophy; no contractures; feet dropped, and toes pointed; often toes and ankles cannot be moved, but only in severe cases is there complete want of movement of knees and thighs; upper extremities affected in much the same way, but less severely than lower. "The face is invariably much affected from the early days of the illness; the facial folds disappear, the cheeks are flat and smooth, the forehead is

devoid of wrinkles, the lips are slightly everted, and when the patient is asleep the eyes are incompletely covered by the lids. The face has consequently an expressionless appearance which, once seen, cannot be again mistaken. Articulation is slurred and indistinct owing to the palsy of the lips, fluids often dribble from the corners of the mouth, and during mastication the food frequently collects between the teeth and cheeks." All these (and other) symptoms are due to involvement of the muscles supplied by the facial nerves, which are severely affected. The trunk muscles are much less seriously involved; the intercostal and abdominal muscles may be slightly affected. The diaphragm escaped in all the cases seen. The tongue and larynx are never, and the palate seldom, implicated, but there may be considerable difficulty in swallowing solid food. The muscles of mastication may be weakened. The pupils remain normal; but in three cases there was diplopia, due in two of them to paralysis of an external rectus. Tendon phenomena are in abeyance, but the superficial reflexes, except the plantar, are usually present. Sensory symptoms are less prominent; there may be dull, aching pains in the feet and legs. There is surprisingly little disturbance of the various forms of sensation, but patients may not be able to recognize passive movements of the limbs within the normal range, and have no accurate knowledge of their positions in space. Occasionally there is slight hyperæsthesia. The majority of the patients had more or less difficulty in starting and completing micturition. Very occasionally there is incontinence of urine and fæces. The patients' mental state remains normal. The urine is natural.

After two or three weeks' illness a rapid improvement sets in: but it may be another two or three weeks before the patient is well. Holmes met with two fatal cases, one from bronchitis, the other from bronchopneumonia; apart from these, recovery was complete, and no paralysis remained.

Pathology.—An unavoidably incomplete examination of the two fatal cases was made. In one, a few of the peripheral fibres of one sciatic nerve were undergoing fatty degeneration, but no changes could be found in some lumbar and sacral nerve-roots. In both cases, alterations similar to those seen in other forms of peripheral neuritis were visible in the ventral horn cells. In three cases, examination of the blood and cerebrospinal fluid revealed no pathological changes or organisms.

Diagnosis.—Holmes writes that "the differential diagnosis does not present any great difficulties if its special clinical features are recognized. These are a rapidly-developing and widespread flaccid motor paralysis, which involves to an exceptional degree the facial muscles, those concerned in deglutition, occasionally the ocular muscles and the sphincters. Sensory disturbances, on the other hand, are relatively insignificant, and the amount of pain and paræsthesia is slight in relation to the severity of the motor affection." Certain of the cases had been diagnosed as Landry's paralysis; but

"this term should be restricted to a condition which begins with progressive paralysis of the lower limbs that rapidly ascends and involves the trunk muscles, and as a rule leads to a fatal termination before the cranial nerves are affected."

TREATMENT.—This should be conducted on general principles. Care should be taken that the paralyzed muscles are not unduly stretched. Certain of the cases seemed to benefit from **Diaphoresis** and the employment of **Diuretics.**

REFERENCE.—[1]*Brit. Med. Jour.* 1917, ii, 37.

PREGNANCY.—(*See also* ECTOPIC GESTATION ; LABOUR.)

W. E. Fothergill, M.D.

Eclampsia.—It is reported by Mayer[1] that there is a marked diminution of eclampsia in the Tübingen clinic since the outbreak of the war. A similar reduction of eclampsia has been recorded in Berlin. The spare war diet is believed to have brought about this beneficial change. There is said to have been an increase in nephritis, but nephritis is not the cause of eclampsia. In southern latitudes, where the diet is habitually less rich in proteids and fat, 'pregnancy kidney' and eclampsia are known to be much less common than in more northern climes, where meat is more freely consumed.

McPherson[2] published a paper in 1909 in which he did not favour the 'conservative' treatment of eclampsia. His maternal mortality with 'active' methods was 30·8 to 33 per cent. Subsequently he began to use the so-called 'Rotunda treatment,' and his maternal mortality fell to 8·6 per cent. The 'Rotunda treatment,' briefly, is as follows: Upon admission the patient is catheterized, the blood-pressure is taken, and she is put in a dark room. **Morphine Sulphate,** 0·5 gr. by hypodermic, is given, followed by stomach lavage and 2 oz. of **Castor Oil** poured down the stomach tube. Colonic irrigation of 5 gallons of 5 per cent glucose solution is given. If the blood-pressure is 175 systolic, phlebotomy is done and a sufficient amount of blood extracted to bring the pressure down to 150 systolic. The patient is then kept quiet, and $\frac{1}{4}$ gr. of **Morphine** is given every hour until the respirations drop to eight per minute. At this time the convulsions will have usually ceased, labour will have started, and, as has happened in practically all of the author's cases, the patient will deliver herself in a short time. In cases so treated the blood-pressure is lowered, not only by bleeding, but by the free administration of morphia.

The Kidney in Obstetric Eclampsia.—Newman Dorland[3] discusses the subject from the historical standpoint, and considers that the so-called kidney of pregnancy is secondary to vascular changes in the mother's body. The primary change in the pre-eclamptic toxæmia is a steady accumulation or a sudden influx in the maternal blood of noxious matters of as yet undetermined origin. These toxins produce an irritation of the arterioles of the whole body, with a consequent vasomotor spasm and a rise of arterial tension. The arterioles of the

renal cortex share in this general vasomotor contraction and prevent the flow of blood to the renal cells. Being thus deprived of their blood-supply, these cells show all the manifestations of tissue-starvation, including a suppression or total abolition of their eliminative function. There is no breaking down of the renal tissue with permanent injury of the kidneys in this disease. The correction of the vasomotor spasm will promptly restore the renal function by re-establishing a flow of blood to the renal cells. We have, consequently, in all cases of rising arterial tension in pregnant women, an urgent indication for the early administration of vasoparalysants. Any vasomotor depressant may be used for this purpose — **Glonoin** (syn. nitroglycerin), **Veratrum Viride, Stramonium, Lobelia,**—but the most prompt and efficacious in their action are glonoin and veratrum viride. The former in full doses produces a quick fall in the blood-pressure, and veratrum viride, when properly employed, will produce as large a drop in the blood-pressure, in certain cases, as from 100 to 145 mm. of mercury in from ten to fifteen minutes after the hypodermic administration of the drug. This reduction in the pressure will generally be accompanied by other evidences of the pathological action of the drug, such as nausea and retching as well as a leaking of the skin—an active diaphoresis—which, in itself, is a desirable result in this condition of the body.

A profuse diuresis follows in from two to four hours after the administration of the drug, and that in the presence of a complete suspension of the renal action for from twenty-four to thirty-six hours. Glonoin in large doses always produces active diuresis ; and veratrum viride, if given in doses of from 5 to 15 min. of the pharmacopœial fluid-extract, will always induce a very copious diuresis, as much as two quarts or more of urine being voided in from two to four hours. Edgar, in claiming this action for veratrum viride, adds, "By the use of this drug our first indication, the control of the convulsions, is fulfilled, as well as the second, the elimination of the toxin. It stands next to glonoin as a diuretic and anti-eclamptic." Cragin, Hirst, Davis, Norris, and other obstetricians heartily advocate the use of veratrum viride in eclampsia for these purposes.

Edgar states that "the average blood-pressure in the last months of pregnancy is in the neighbourhood of 120 mm. of mercury. An increase of 30 mm. above the normal average need cause no alarm, but any blood-pressure over 150 mm. should demand investigation and treatment." In eclamptic women the blood-pressure is almost invariably high, reaching 200 mm. or over.

Vomiting of Pregnancy.—Barton Cooke Hirst[4] says that every woman during reproductive life is always absorbing corpus luteum, because one is formed as another is absorbed as long as menstruation goes on. But during pregnancy there is a period when this absorption does not go on, because the corpus luteum of pregnancy continues growing for a considerable time—far longer than that of menstruation. He sees in this temporary deprivation of corpus luteum a possible

cause for the vomiting of early pregnancy. He accordingly administered the extract of **Corpora Lutea** to thirty-six women suffering from pregnancy vomiting, and succeeded in curing thirty-two.

REFERENCES.—[1]*Med. Rec.* 1917, i, 118; [2]*Bull. Lying-in Hosp. New York*, 1917, xi, 48 (abst. *Surg. Gyn. and Obst.* 1917, i, 627); [3]*Med. Rec.* 1917, i, 579; [4]*Jour. Amer. Med. Assoc.* 1916, ii, 1848.

PROSTATE, DISEASES OF. *J. W. Thomson Walker, M.B., F.R.C.S.* McCarthy[1] found that in 104 cases of *prostatic abscess*, rupture into the urethra took place in 74. Of these, 27 per cent subsequently developed more or less serious complications, possibly from faulty drainage. The author therefore holds that large abscesses of the prostate should be drained surgically, regardless as to whether or not they may have opened spontaneously. The perineal route should be used, and the prostate exposed by an inverted V-shaped incision. In the majority of cases the bladder should be drained at the same time.

Cunningham[2] discusses the problem of *prostatic obstruction*, and concludes that prostatic patients form the most aged group of individuals commonly requiring surgical relief. Pre-operation study and preparation render the patient more suitable for operation, or determine him to be inoperable. No one operation is suitable for all cases, because of variation in the type of the gland and in the vitality of the patients. Any detail of treatment which conserves the patient's strength is important. Unusual vigilance in the post-operative period, the early recognition of complications, and the immediate institution of appropriate treatment, play a very important part in the convalescence and mortality.

Legueu[2] has recorded altogether 150 cases of **Prostatectomy** done under *local anæsthesia*. The mortality is 5 per cent, which is the lowest mortality in any of this series of 450 prostatectomies. In other cases, where general anæsthesia has been used, the mortality is 10 per cent. The local anæsthesia permits prostatectomy to be done in many cases when it would be impossible where general anæsthesia was required, such as in valvular disease, bronchitis, and in the obese. The only contra-indications are irritable bladder from cystitis or stone, and fibroprostatitis without adenoma. He uses novocain, injecting altogether 250 to 300 grms. of a 1–200 solution, with 5 min. of epinephrin (1–1000) to every 100 grms. of solution. A little sloughing of the incision was observed in one case, but no other bad effects were noted.

Young,[3] writing on the use of **Radium** and the **Punch Operation** in desperate cases of enlarged prostate, says cases are occasionally met where there is a severe cardiac condition which does not clear up or improve sufficiently under treatment to warrant the risk of a serious operation. These usually go unoperated and unrelieved, but Young reports the successful treatment of such a case. During eight months the patient had two doses of radium applied from back to front, five

intra-ureteral treatments at a position against the middle lobe, or within the sphincter, of seven hours' duration, and in the anterior half of the prostatic urethra two hours; five fulgurations to the middle and lateral lobes at the vesical orifice. As a result, the prostate decreased greatly, but complete retention of urine persisted. A punch operation was carried out, and eight cuts in all directions around the prostatic orifice were made. The final result obtained was the passage of urine during four hours in large amount. Urination was normal, and the bladder apparently emptied itself perfectly. The long duration of the treatment with radium suggests that it should be confined to cases with severe complicating conditions which preclude perineal prostatectomy.

Peacock[1] holds that there is a definite relationship between the *blood-pressure and filtration in the kidney glands*, and that a high blood-pressure is purely compensatory. Any sudden and permanent lowering by radical measures is often fatal. A persistently high pressure, even in the absence of albumin and casts, usually means a hidden nephritis. Chronic prostatic obstruction produces pressure changes in the ureters, the kidney substance, the kidney circulation, and the secretion of urine. A sudden relief of this intravesical pressure produces an immediate fall in blood-pressure from 20 to 100 mm. Hg. If the pre-operative pressure is over 150 mm. Hg, the risk of a cystotomy or prostatectomy is greatly increased. Compensation between the blood-pressure and the urinary excretion will take place if the pressure is not abnormal, and will occasionally do so in a high pressure when there is unusual vitality or compensatory power.

References.—[1]*Ann. Surg.* 1917, May, 642; [2]*Jour. Amer. Med. Assoc.* 1917, i, 1293; [3]*Ann. Surg.* 1917, May, 633; [4]*Ibid.* 1917, ii, 659.

PROTEIN EXTRACTS. (*See* Anaphylaxis.)

Employment of **Milk** injections (p. 20).

PRURITUS ANI. (*See* Rectal Surgery.)

PSORIASIS. *E. Graham Little, M.D., F.R.C.P.*

Jelliffe and Evans[1] seek to explain what seems to have been a very ordinary attack of psoriasis in a young unmarried Jewess, with strong and unsatisfied sexual instincts, as 'a hysterical conversion symbolization.' Psycho-analysis is claimed to have established a 'libido' of the patient for her father, and subsequently for her brother. The latter phase is oddly enough accounted as morally an improvement (apparently because the brother was unmarried!), and *pari passu* with this transference of 'libido' the psoriasis patches became 'dim' and 'colourless.' As at least six weeks were occupied by the psycho-analysis the change is not exactly startling, but on this incredibly slender thread the authors hang the assumption that "in this particular patient the psoriasis was psychogenic in origin," and are "tempted to believe that a large number of psoriasis lesions are likewise 'psychogenic,' a belief with which few dermatologists will agree.

Bory[2] advocates intramuscular injections of **Sulphur** with **Eucalyptol**, as in the following formula :—

℞ Sulph. Præcip. pur.	20 cgrms.	Sesame Oil	80 c.c.
Eucalyptol	20 c.c.		

The sulphur is to be dissolved in warm sesame oil, then cooled down, when the addition of eucalyptol is made. The injection is best performed in the buttock as in the treatment of syphilis with grey oil. The injections may be given at intervals of three or four days, or longer, and good results may be expected after four or five injections.

Vignolo[3] Lutati comments on the increased incidence of psoriasis in the army, especially in men engaged on active service, and considers that a double causation, trauma and shock, or nervous stress, may be accountable for the increased frequency. Several convincing histories are produced of a first attack of psoriasis coming on acutely after wounds.

Adamson[4] recommends the following ointment for use in treating psoriasis in soldiers :—

℞ Hydrarg. Ammon. Chlor.	ʒj	Ung. Paraffin. B.P.	ʒvj
Liq. Picis Carbonis	ʒss		

To be well rubbed in twice daily with a piece of flannel.

This ointment, which is made with a stiff basis, is usually more effectual than when made with simple vaseline. If this ointment fails, **Ung. Chrysarobini B.P.** should be employed, with the usual precautions of avoiding the face, hands, and scalp, and relaxing the treatment if chrysarobin erythema appears at any part. The patient should be kept in bed when chrysarobin ointment is used.

Injections of **Milk** suggested (p. 20).

References.—[1]*N. Y. Med. Jour.* 1916, ii, 1077 ; [2]*Presse Méd.* 1917, June 7, 331 ; [4]*Lancet*, 1917, i, 221.

PSYCHO-ANALYSIS.

Bedford Pierce, M.D., F.R.C.P.
Kate Haslam, M.D.

The subject of psycho-analysis continues to provoke heated controversy, and it is not easy to find anywhere a calm and reasoned consideration of the subject. The difficulty lies in the extreme and almost impossible position which Freud himself has taken in certain directions, in consequence of which many of his earlier adherents have been unable to follow him. Some of these in turn have gradually modified their own views, so that at the present time there is little agreement. But articles containing little else than satire and ridicule, such as a criticism by Delage,[1] which the editor of the *Journal of Mental Science* commends as "true to fact," are apt to mislead. In concluding a paper on "The Interpretation of Dreams," R. Armstrong-Jones[2] says, "In this country at any rate, thanks mainly to Dr. Mercier, Freudism is dead." We find, on the other hand, that the teachings of Freud have profoundly influenced some of our best modern workers in psychiatry. It may be noted that the methods

of psycho-analysis are altering. At first hypnotism was freely used; next an hypnoidal state was recommended; then word-association, introduced by Jung, was advocated; but these are now rarely used. The chief method employed is free association without adventitious aids or unusual conditions, and the analysis of dreams following up the clues so obtained by free association.

Before reviewing recent literature, three aspects of the subject may be worth consideration: (1) The theory of an unconscious mind; (2) The influence of sexual considerations in the production of hysteria; (3) The study of dreams.

1. The term 'the unconscious mind' is in a sense self-contradictory. But it is generally recognized that forgotten memories are not necessarily lost though they cannot voluntarily be remembered, and it is not unreasonable to assume that past incidents are stored in the sub-conscious or unconscious mind. This teaching is not primarily due to Freud; but the further assumption, that these forgotten memories unconsciously reappear as disease symptoms, dates from 1895, when Breuer and Freud published their studies in hysteria. The view that forgetting is not a passive process but an active one, that a successful endeavour to repress unpleasant memories does not really dispose of them, but that they pass into the unconscious, is essentially Freudian, as well as the conception that there exists a mechanism, called the censure, which prevents these distasteful thoughts, or complexes, from entering consciousness. During sleep, hypnotic states, and automatism, and in some forms of insanity, the censure is removed, so that past impressions crowd upon the mind. It is, however, assumed that the repressed memories reappear in strange symbolic forms, so that the true source of the symptom may not be recognized. Sometimes, by 'conversion,' the repressed complex appears as a physical symptom, such as an hysterical palsy. In such cases it is claimed that the symptom is in reality a wish-fulfilment, and gives relief from some unsatisfied desire, so that the diseases give the personality a means of escape from an intolerable or distasteful situation. Rivers[3] gives an interesting account of Freud's theory of the unconscious, especially in relation to war neuroses.

Up to this point the theory gives little cause for criticism. We all know that the way in which we have met our past mental conflicts affects the development of our character, and that our personality depends upon our mental reaction to numberless incidents and experiences of which we have no conscious recollections. It is not a great step further to assume that unpleasant, painful memories, though forgotten for the time, have had, and still may have, a hurtful influence. If so, it is legitimate for the physician to seek out these, and, having brought them to light, he may be able by a process of re-education to assist in restoring the patient's peace of mind.

2. If Freud had stopped at this point there might have been but little opposition, but from the first he insisted that the repressed memories were almost always of a sexual nature, and that they could

often be traced to experiences in early childhood or even infancy. Thus, hysterical symptoms were stated to be due to unrealized wish-fulfilments, and obsessions to sexual infantilism continuing into adult life. Although he used the word sexual in a very wide sense, which almost included every form of pleasure, his teachings caused a storm of indignant opposition, and many of his early disciples—Adler, Jung, Stekel—have ceased to follow him.[4] Nevertheless, at the present time the disciples of Freud continually publish cases which repel the reader. The thought arises: Even if the analysis correctly ascertains the facts, what possible good can come of such revolting disclosures? Helen Boyle, in this connection,[5] considered this line of treatment wrong and opposed to nature: "The careful analyzing which brought into prominence matters which troubled the mind seemed to be reversing that natural tendency to bury those troubles as deeply as possible." More serious than this is the danger of fictitious disclosures, when, unconsciously perhaps, the patient relates incidents of sexual experiences in childhood which never happened. The subject is full of pitfalls, and many writers entirely reject Freud's teaching in this direction. But even here it is well to keep an open mind. It is impossible to ignore the sexual element, as anyone with experience of mental disorders will admit. The conversation of almost any patient suffering from maniacal excitement is witness to this. But the point at issue is not so much the symptoms of disease as the mechanism of their production, a matter of far wider significance than any theory of the influence of sex or infantilism.

3. The third element of Freud's teaching deals with the interpretation of dreams. He himself considers it of the utmost importance, and states: "I have acquired the habit of measuring the grasp of a psychological worker by his attitude to the problem of dream interpretation."[6] This subject can only be briefly mentioned. The theory assumes that during sleep the censure is partially removed, and we consequently get glimpses of the unconscious mind. The phenomena of the dream are called the manifest content, but behind this is the latent content, which represents the true meaning of the dream. The strange incidents of the dream are regarded as symbols by which the latent content finds expression, and these can be interpreted by training and experience. In this way certain frequently recurring incidents of dreams are considered to have definite meanings, and some students of Freud have commenced a sort of dictionary of symbols and their meaning to facilitate analysis. The objection to this is the readiness with which the student can jump to conclusions, and the reader of published interpretations, though struck by their cleverness, is often far from convinced as to their correctness. Dream interpretation is beset with snares. Even supporters of this method of investigation have misgivings. Stekel[7] thus writes: "All dream interpretation depends upon the self-knowledge of the analyst. . . . Every psycho-analyst has also his individual complexes for which he has then no understanding in the psycho-analysis, if they have not

become known to him. I call this phenomenon, psycho-analytical scotomata. It is therefore necessary to know one's own dream analysis, and in the first place to know oneself."

Maurice Nicol[8] describes Freud's method of the reduction of the symbol to its component parts, "like pulling the threads out of a Turkey carpet to understand it." He considers therefore Freud's theory analytical, and supports Jung in what he terms constructive methods of interpretation, which shape and develop a symbol to fit in with the immediate life of the dreamer, and so bring it to the level of contemporary experience as a living thing. He admits that this gives even wider opportunities for speculation, saying that the interpretations "can always be adapted, in some degree, to satisfy the dreamer and the interpreter."[9] In spite of this, he has no doubt as to the value of the study of dreams to the physician.[10]

Rivers[11] relates a case of *claustrophobia* which illustrates the value of dream analysis. A medical man, 31, had suffered from dread of closed spaces; he also stammered, and had other nervous ailments. Six years previously he had been treated by psycho-analysis in the expectation that some infantile sexual experiences would be discovered, but this was unsuccessful. He joined the army, but life in dug-outs was almost intolerable; he became sleepless, and was invalided home. It was then he learnt for the first time that the repressed memories need not be of a sexual nature. Self-analysis of his dreams soon revived a striking episode of his life which had happened when he was four years of age. He was able to recollect his extreme terror after an interview with a rag-and-bone man when left alone in a dark passage, the door of which he could not open, whilst there was a dog growling at the other end of the passage. Inquiry showed that the story was not fictitious, though it had been forgotten for twenty-seven years. The claustrophobia was immediately relieved, and did not recur, though the other nervous symptoms remained. Rivers points out that the analysis conducted with the object of finding a sexual complex was a failure, partly because of its preconceived bias, and partly because it started with the stammering and not the phobia. It is suggested that repeated illnesses in childhood may have caused the failure of memory. The recovery was probably not due to faith or suggestion, as it was concerned only with the claustrophobia; the other symptoms remained, although the patient expected the stammering would be cured by psycho-analysis.

Rivers considers dream-analysis rightly conducted of great value, but he believes that the teachings of Freud and his disciples require thorough revision, and protests against the rein given to the wildest speculations in the methods of interpretation. He has found free association by the patient himself, in the half-waking state immediately following the dream, most fruitful. The physician conducts the waking thoughts of the patient into directions likely to awaken the desired experience. No ready-made interpretation of symbols is called for, but play is given to the associations that the dream

provides. It is therefore of little use except in the case of intelligent patients.

A discussion on the subject of dreams was introduced by Sir Robert Armstrong-Jones at the Medico-psychological Association.[12] He described three depths of consciousness: the first concerning thoughts in the 'focus of consciousness'; the second, concerning thoughts present but not noticed by inattention, to which he would confine the term subconscious; and the third, the unconscious, from which thoughts emerge by means of suggestion or association. He denounced Freud's teaching on the influence of sexual repression and perversion, saying, "The psycho-analyst always finds what he is looking for, and there is not a single object in the universe for which sexual significance cannot be discovered; even the Zeppelins in the sky are a phallic symbol." Three striking instances are related in which dreams were concerned with facts outside the knowledge of the dreamer. There is no reason to doubt the good faith of the narrators, and yet the critic would like to ask questions, seeing that the 'will-to-believe' so easily leads to bias and unwitting misrepresentation.

Most of the speakers condemned the Freudian theory. Springthorpe[13] considered Freud's conclusions an insult to humanity. He remarked that comparing his present dreams with those of earlier years, he found them more regulated and orthodox, so that persons dreamt about behaved better than they used to do. Soutar[14] thought that the sexual interpretation of dream phenomena was contrary to all experience. He considered dreams, however, gave some indication as to prognosis. When melancholic patients began to dream happily, an alteration for the better had already set in, and recovery was to be expected. Steen thought that Freud's work deserves the careful attention of British alienists. In children, dreams frequently expressed wish-fulfilments in an obvious way, and the same was observed in patients, as, for instance, the dream that they are back at home. Sir Geo. Savage stated that Hughlings Jackson was the author of the epigram, that insanity is the state of 'dreaming awake.' He looked upon the subconscious mind as being very important, and had frequently used the simile that when a house was built the foundations and basement were underground and out of sight.

Rothsay Stewart found that with practice he could always make out the relation between the incidents of a dream and some event that had occurred not more than two or three days previously. He found he never dreamed of anything he had been working at for a considerable time, and suggested that the reason was that the nerve cells concerned were fatigued. The dreams always related to subjects to which he had recently given passing attention, some book he had read, or object he had seen. The incongruity was due to the absence of the inhibitory power exercised during consciousness.

Maurice Nicol, in a recent work, *Dream Psychology*,[15] adopts Jung's views of the significance of dreams as opposed to Freud's. Twenty-four dreams are quoted, and some discussed at considerable length.

In some the inner significance seems clear. Thus:[16] "I am in a room in the midst of packing. I have a train to catch, and the floor is covered with many things I want to pack. I cannot get them all into the trunk, and in a state of great agitation I run out into the street." This dream was constantly repeated in the case of a lady with many activities, constantly organizing and attending meetings. The dream symbolizes the consequence of attempting too much. But in many of the dreams quoted, Nicol traces an aim and purpose of the unconscious which at times approaches the transcendental. "In handling a dream the aim is to discover the motive of the unconscious.[17] . . . In the case of the neurotic, it reveals what is going on behind the scene, and if we look upon the neurotic as a person in whose psyche many abnormal strains and counter-strains exist, it is evident that the discovery is very valuable."

Dreams are looked upon as fantasies to cover the difficulties of life; they are not merely attempts at wish-fulfilment; they may be of a warning nature, or even prophetic. "The dream[18] makes use of the incidents of the day in much the same way as people make use of the costumes and draperies in an ordinary house when they suddenly decide to play charades. All their elaborate pantomime merely symbolizes the meaning of a word which the onlookers must guess by interpretation."

Jung,[19] in discussing the origin of neuroses, states: "The foundation of the facts remains the same; the first hypothesis of every neurosis is the existence of an unconscious conflict. According to Freud this is an erotic conflict, or, to speak more exactly, a battle of the moral consciousness against the unconscious infantile sexual world of fantasy, and its transference to external objects. According to Adler's theory, it is a battle of the superiority of the ego against all oppressive influences, whether from inside or outside." He himself considers it a "conflict between thought and unconscious feeling," or between "feeling and unconscious thought." This appears to mean a conflict between the conscious and unconscious. It would be impossible to give an outline of Jung's theory of the unconscious in a few words; it is sufficient to say that it is assumed to contain hereditary and racial tendencies, and to be the source of inspiration and warning. From the unconscious spring originality and strivings of great importance, whilst want of harmony between the conscious individual and the unconscious leads to neurosis or mental disturbance. Dreams are looked upon as throwing light upon the unconscious. "For both Freud and Adler the fantasy (dream) is nothing but a so-called 'symbolic' guise of what both investigators suppose to be the primary propensities and aims. But in opposition to these views it should be emphasized—not for theoretical but for essential practical reasons—that the fantasy may indeed be thus causally explained and depreciated, but that it nevertheless is the creative soil for everything that has ever brought development to humanity."[20]

We therefore find the teachings of psycho-analysts in respect to

dreams widely at variance. On the one hand is the crude view that the dream discloses a wish-fulfilment, usually, of a gross and carnal nature, expressed in symbolic form; on the other hand is the view that the dream gives a glimpse of a power within us, which, if we could but understand and take advantage of it, means a real development of character. Jung[21] expressly states that psycho-analysis by itself does not cure a neurosis, but it points the way by which the patient can himself find a path toward recovery by self-development.

Elliot Smith and Pear[22] consider the study of dreams of importance to the physician. They say no one who has ever honestly collected together and compared the memories which have coalesced together to compose a dozen of his dreams—especially if he has done so with the help and under the cross-examination of a candid friend who knows him well—will maintain that the material thus found is unimportant. As Freud says, "The dream never occupies itself with trifles. . . . The dream, then, is the chief gate by which we can enter into the knowledge of the unconscious. . . . Thoughts and desires which, if they attempted to dominate consciousness in the waking life, would be promptly suppressed, arise, develop, and expand to an astounding extent in the dream."

It is extremely difficult to give the results of psycho-analytical treatment. Coriat,[23] however, reports 93 cases treated personally, of which 46 recovered, 27 were much improved, 11 improved, and 9 not improved. The duration of treatment was one month in the mild cases to six months in the more severe. Patients were usually seen daily, or at least three times weekly. In anxiety cases recovery was considered satisfactory if the fear disappeared by day and the anxiety dreams at night. Among the cases reported as recovered were two of *dementia præcox*, one of whom "regained control of his subconscious sphere," either through correction of his delusions or their gradual alteration and the erasion of the disturbing complex. The writer considers the recovery was due to "a complete transference of reality due to an actual breaking up of the mental process which led to the schizo-phrenic reaction." One case showed typical negativism, which cleared up after two months' intensive treatment, and has been well for three and a half years. The other was a typical 'shut-in personality.' The manic-depressive case recovered in six weeks, and was treated in the midst of the depressed phase. Previous attacks had been of much longer duration. This report is very unconvincing, especially the alleged cure of a depressed patient in six weeks. Many physicians will have seen a case clear up in half the time. Surely the cure of manic-depressive insanity should mean something more than the recovery from a single attack.

The treatment of *mental torticollis* by psycho-analysis is said by Pierce Clark[24] to have been completely successful in three out of five cases. In all the cases the disease was severe in type, and all sorts of physical and drug therapy had been tried and found wanting. The mechanism of the torticollis is said to be fairly definite: "It is a

gesture of the infantile personality, a turning away from the difficulties of adult adaptations under stress, and the use of a type of movement that has been employed by that infantile make-up to gain protection and satisfaction." "Nothing less than a sincere complete reconstruction of the whole neurotic attitude can make these torticollics remain well." The article gives a detailed account of three of the cases, with photographs.

Ether hypnosis said to be of value in psychotherapy (p. 14).

REFERENCES.—[1]"Une Psychose Nouvelle: La Psycho analyse," *Jour. Ment. Sci.* 1917, Jan., 61; [2]"Dreams and Their Interpretation," *Ibid.* 1917, April, 219; [3]*Lancet*, 1917, i, 912; [4]*Jour. Ment. Sci.* 1917, Oct., 553; [5]*Jour. Ment. Sci.* 1917, April, 221; [6]Review in *American Journal of Insanity* of Brill's translation, 1917, July; [7]*Psych. Anal. Review*, 1917, Jan., 108; [8]*Dream Psychology* (Oxford Med. Publications); [9]*Ibid.* 44; [10]*Ibid.* 76; [11]*Lancet*, 1917, ii, 237; [12]*Jour. Ment. Sci.* 1917, April, 200; [13]*Ibid.* 220; [14]*Ibid.* 221; [15]*Dream Psychology*; [16]*Ibid.* 144; [17]*Ibid.* 76; [18]*Ibid.* 175; [19]*Analytical Psychology*, 404; [20]*Ibid.* 468; [21]*Ibid.* 469; [22]*Shell Shock*, 61, 62; [23]*Psych. Anal. Review*, 1917, April, 209; [24]*Med. Rec.* 1917, ii, 48.

PSYCHONEUROSES OF WAR. (*See* SHELL SHOCK.)

PUERPERAL ECLAMPSIA. (*See* PREGNANCY.)

PUERPERAL PERITONITIS. (*See* PERITONITIS, PUERPERAL.)

PULMONARY ABSCESS. (*See* LUNG, ABSCESS OF.)

PULMONARY TUBERCULOSIS. (*See* TUBERCULOSIS.)

PYELOGRAPHY. *J. W. Thomson Walker, M.B., F.R.C.S.*

In an article on the use of **Thorium** in pyelography, Burns[1] states that it fulfils all the conditions necessary for an ideal pyelographic medium, namely, it is non-toxic, non-irritating, opaque—with a good shadow and sharp definition,—has a marked degree of fluidity, and is inexpensive. The best combination for use contained the double citrate of thorium and sodium, with an excess of sodium citrate and some sodium nitrate. The solution used contains 10 and 15 per cent of thorium—the 10 per cent for ureter pyelograms. The 15 per cent solution contains approximately 15 per cent of thorium nitrate, about 9 per cent of sodium nitrate, and 21 per cent of sodium citrate, the thorium being probably in the form of a double citrate of thorium and sodium, and not occurring in the nitrate. Solution of thorium nitrate and thorium chloride alone cannot be used clinically, on account of their irritant action, and also from the fact that they precipitate insoluble salts when in contact with the urine. The thorium solution was used in 185 cases without any untoward symptoms. In 5 cases there was a slight reaction, characterized by a slight rise of temperature, nausea, and vomiting, all of which rapidly subsided. As much as 600 c.c. of the 10 per cent solution have been used in the entire urinary tract at one time. The gravity method of introducing the fluid is the most successful and least dangerous. Where marked

impairment of the renal function is present in bilateral disease, only one side should be done at a time, and the second side a few days later. Where a large hydronephrosis and dilated ureter are present, the catheter should be left in the ureter long enough to allow all the solution to flow out after the examination.

An experimental inquiry by Braasch and Mann[2] into the effects of retention in the kidney of media employed in pyelography, led to the following conclusions: The greatest danger in the use of silver preparations is their retention in actively-secreting kidneys. With multiple foci of necrosis, the condition should be regarded as a septic nephritis, and immediate nephrectomy is indicated. Focal necrosis, as the result of infection, may follow the introduction of a ureteral catheter, or of bland fluids with insufficient drainage. Silver-iodide suspensions are less harmful than the colloidal silver preparation. Thorium nitrate in 10 or 15 per cent solution causes the least reaction, but casts a less distinct shadow. Mild chemical irritants—as sodium chloride and boracic acid—when injected and retained in the pelvis of the kidney, do not produce lesions of that organ. Sodium citrate and 20 per cent thorium nitrate, when tested in some drastic manner, produce lesion of the kidney, which seems directly due to the chemical injected, and not to concomitant or subsequent infection. Argyrol, collargol, and cargentos equally produced the most marked changes noted. The weaker solutions of colloidal silver do not appear to be less harmful than a more concentrated solution. Thorium nitrate (15 per cent solution) did not produce changes in the kidney, except possibly in one experiment. Care must be taken in its preparation that the solution is thoroughly neutralized.

References.—[1]*Jour. Amer. Med. Assoc.* 1917, i. 533; [2]*Amer. Jour. Med. Sci.* 1916, ii, 336.

PYLORUS, HYPERTROPHIC STENOSIS OF.

Frederick Langmead, M.D., F.R.C.P.

L. Emmett Holt[1] writes on his experiences based on 141 cases of this condition. He repeats his former conviction that a division into spasmodic and hypertrophic forms is not admissible. Cases differ greatly in degree; in very few is the obstruction complete, but hypertrophy, undoubtedly congenital, is the essential lesion in all, spasm being added as a secondary condition. Not only did Dent find the hypertrophy in a seven-months fœtus, but it is inconceivable that the amount of hypertrophy found within a few weeks after birth could have developed as the result of spasm. Furthermore, the existence of persistent spasm of the pylorus without hypertrophy has not yet been established.

Assuming the hypertrophy to be congenital, it might be expected that symptoms would appear soon after birth, but seldom (in only 4 per cent of his cases) do they appear before the end of the first week, and more often not for two, three, or four weeks, during which the infant seems to be normal in every way. Not until spasm

is added do symptoms appear, but as to the cause of the spasm little is known. That the hypertrophy continues long after the spasm has subsided there is definite proof, and he has frequently observed cases in which an unmistakable tumour could be felt for weeks after vomiting had ceased, the stools had been quite normal, and peristalsis lost sight of. The number of cases is considerable in which a tumour has been found still present at autopsy in children who have died from other causes some time after operation, or who have recovered without operation. After quoting three examples he mentions four cases of his own.

Symptoms.—Holt considers visible gastric peristalsis a constant feature, though it may be necessary to see the patient frequently and observe it closely under favourable conditions, especially immediately after a meal when the child is quiet. Slight atypical waves may be seen in other conditions, but the deep, regular, recurring waves passing from left to right, and frequently followed by vomiting, are a marked feature of nearly every case. A palpable tumour is not essential to diagnosis, but in three-fourths of the cases is unmistakable. It is more obvious in the severer cases. As a means of estimating the degree of occlusion, he urges the importance of emptying the stomach two, three, or four hours after a test meal by means of a simple suction apparatus composed of a rubber catheter, a small laboratory wash-bottle, and a suction tube. The test meal consists of two or three ounces of breast milk; diluted condensed milk answers the purpose, but mixtures of unboiled cow's milk provide a curd which blocks the tube.

Diagnosis.—In order of importance he mentions the following diagnostic points: (1) The history, if obtained from a reliable mother or nurse; (2) Abnormal gastric retention, observations being repeated four or five times at least; (3) Peristaltic waves, if typical; (4) The presence of a palpable tumour; (5) Wasting, constipation, scanty urine, etc. The question of surgical interference should not depend upon the presence of a tumour. He does not favour Röntgen-ray examination, for it is doubtful whether it discloses more than can be learnt by careful observations of the gastric retention, and most of the infants bear the manipulations incidental to a bismuth meal badly. It is doubtful whether the results are commensurate with the risk. There are quite a number of different pathological conditions in which gastric peristalsis, and presumably pyloric spasm, may occasionally be seen; he instances duodenal ulcer, congenital atresion of the œsophagus, a congenital band pressing upon the upper part of the duodenum, tuberculous peritonitis with general matting of intestines; but to confuse these cases with hypertrophic stenosis, or to consider them as closely allied because they have one or two symptoms in common, is not justifiable, and has greatly obscured the discussion of the subject.

Treatment.—*Medical*: This consists in careful feeding and stomach washing. Breast milk should be the food if possible, other-

wise milk not rich in fat. The water for the lavage should be warmer than usual—up to 112°. For prostrated patients 150 to 250 c.c. of **Saline** with 4 per cent **Dextrose** may be given subcutaneously at one time. Rectal feeding is of little use. The bowels are best moved by an enema. Drugs and local applications of heat over the epigastrium are of little value.

Olive Oil said to relieve pylorospasm (p. 21).

Surgical.—He favours the **Rammstedt Operation**, which consists in simple division of the circular muscular layer of the pylorus by external incision. Of 41 cases operated upon by gastro-enterostomy there was a mortality of 51 per cent; of the 28 cases in which the operation was performed by Downes the mortality was 43 per cent; of 67 cases in which the Rammstedt operation was done, in all but one by Downes, the mortality was but 24 per cent. The advantages are: (1) The short time required—only ten to fifteen minutes; (2) The stomach is not opened, and the risks of non-union, leakage, and peritonitis from this cause are eliminated; (3) Hæmorrhage is seldom troublesome, no suturing is needed, and there is little handling of the viscera; (4) Shock is less severe; the temperature reaction is less marked; (5) Food can be pushed more rapidly, and disturbances of digestion, particularly diarrhœa, are much less frequent and severe. The special dangers include wounding of the mucous membrane, incomplete division of the constricting muscle, and hæmorrhage. The first of these occurred in but three of the cases, two among the first operations performed. Two recovered, but one died from leakage and peritonitis. Incomplete division happened once. Hæmorrhage occurred only once, and the patient was a bleeder. Of the 16 who died, 6 infants died from shock a few hours after operation, but all were in an extremely bad condition at the time; 1 infant had whooping-cough and died from bronchopneumonia; of the remaining 7, 3 died from peritonitis, 1 from hæmorrhage, 1 from continued wasting, 1 from continuance of the vomiting (the constriction not being entirely relieved), and in 3 death occurred suddenly on the first, second, and seventh day respectively, no cause being discovered.

After-treatment.—The success is due, in no small measure, to proper after-treatment. Everything must be done to conserve every particle of strength which the patient possesses. Exposure during the operation must be of the slightest. The room must be warm, and the patient further protected by artificial heat. Before the anæsthetic the stomach is emptied of food, gas, and mucus. Stimulants during the operation are rarely called for. After the operation, the patient is wrapped in hot blankets and placed in a bed, surrounded by hot-water bottles. The head of the bed is kept lowered until the effect of the anæsthetic has passed off. From 120 to 240 c.c. of **Physiological Saline Solution** are given subcutaneously, usually between the scapulæ. Of stimulants hypodermically, **Epinephrin** has given the most satisfactory results in doses of from 3 to 5 min. of 1–1000 solution.

Feeding is begun as soon as the infant recovers from the anæsthetic. The position is with the head raised to facilitate expulsion of gas. Breast milk is indispensable, but it must be given in known amounts at regular intervals. At first the amount should not be more than two or three teaspoonfuls diluted with one or two teaspoonfuls of water. This is given with a medicine dropper and repeated in gradually-increasing amounts every three hours. Water is given in the intervals in similar quantities. At the end of twenty-four hours the infant is usually taking four or five teaspoonfuls of breast milk undiluted, and at the end of two days 1 oz. every three hours. By the fifth or sixth day this is gradually increased to about 2 oz., and at a week or ten days, but not before, the infant may be put to the breast, at first for only two or three minutes.

The administration of a teaspoonful of **Castor Oil** at the end of twenty-four hours is a routine practice. Often all disposition to vomit ceases as soon as the bowels have acted freely. Diarrhœa not infrequently occurs, and has been most successfully controlled by substituting protein-milk for part of the breast milk and administering moderate doses of opium and bismuth. Some vomiting is to be expected during the first twelve to twenty-four hours, due to accumulation of gas in the stomach. It is relieved by posture or the passage of a stomach tube.

The results obtained have convinced him and his colleagues that, for the average infant admitted with hypertrophic stenosis, the immediate performance of the Rammstedt operation offers a better chance of life than any other method of treatment yet proposed. In many of the milder forms the patients recover with only medical treatment. If improvement does not occur within two or three weeks, they should be treated surgically ; with the more severe forms only a short delay is permissible. The symptoms which indicate surgical intervention are rapid loss of weight, persistent forcible vomiting, and active peristalsis. The patients who come under observation after four or five weeks of vomiting and marked loss of weight are best treated by operation as soon as the diagnosis is established. Cases followed show that growth and development are not impaired by the operation. Patients not operated upon usually show no symptoms after the first year; yet the possibility that this condition may be the basis of pyloric obstruction in later life undoubtedly exists.

C. G. Grulee and D. Lewis[2] state that surgical treatment should be employed for all diagnosed cases. They perform gastro-enterostomy, and have had a mortality of 20 per cent. They have had no serious post-operative complications, and consider injury to the mucosa during Rammstedt's operation a serious drawback. During gastro-enterostomy there is a better chance of remedying a technical error than during Rammstedt's operation. They also lay stress on the need for careful post-operative treatment.

W. E. Gallie and L. B. Robertson[3] are of opinion that if, in spite

of careful feeding and regular lavage, the retention increases and the symptoms are exaggerated, surgical intervention is indicated; but if the symptoms are not severe, medical treatment may be tried. They favour the Rammstedt operation, and recommend a post-operative regimen similar to that described by Holt.

References.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 1517: [2]*Surg. Gyn. and Obst.* 1917, ii, 120; [3]*Ibid.*

PYORRHŒA ALVEOLARIS. *W. H. Dolamore, M.R.C.S., L.D.S.*

Goodrich and Moseley,[1] as the result of a year's study of many hundreds of cases, state that they are inclined to incriminate leptothrix as the primary cause of the initial marginal gingivitis, and that the tartar found on teeth, almost always in association with pyorrhœa, is of organic origin, the formative organism being leptothrix. Tartar begins as a soft deposit (the materia alba of Leuwenhoek).

Fig. 99.—Part of a colony of leptothrix, with 'flowering head' branches. Drawn from a fresh preparation. The axis of this kind of branch consists of a single swollen thread. Some branches are seen in optical section. ×625.

chiefly composed of colonies of leptothrix. This they regard as a pleomorphic organism. The colonies vary immensely, but in a typical specimen the centre is a nodule of hard tartar, from which radiate bundles of long coarse threads divided into segments of variable length, usually giving a reddish-purple reaction with Gram's iodine. The groundwork between these bundles is filled in with granular or coccoid forms and traversed by numerous finer threads, most of

which do not give the iodine reaction. They have not observed true branching. These bundles divide and subdivide before reaching the periphery, and may end in a few threads. These may project far beyond the general surface of the colony and, being usually covered with coccoid forms and finer and shorter threads set more or less at right angles to this axis, form a terminal branch, one of the many variable forms with which the whole surface of the colony is thickly beset. The coccoid forms on the branches appear to be set in rows radiating from the axial threads. Threads of leptothrix often show terminal swellings or 'clubs,' both inside the colony and at the periphery. These are very prone to calcify.

Fig. 100.—A 'bottle brush' branch. Drawn from a preparation stained with Stephens' ink. ×600. (*Figs.* 99, 100, *by kind permission of the Royal Microscopical Society.*)

A colony on the surface of a tooth or other attachment is modified in shape, but the bundles of coarse iodine-reacting threads always radiate from the centre of attachment, and there the hard tartar is deposited, chiefly by the progressive calcification of these threads, and is thus built up layer by layer as the colony grows and spreads. Leptothrix colonies vary greatly. Those most branching and diverse are met with usually where the tartar ridge meets the surface of the gum flap. Colonies situated above the surface of the gum margin, slightly higher up on the tooth, have usually less complicated branches. A variety frequently found on colonies in this position has been described as 'flowering heads' by various writers (*Fig.* 99). Under certain conditions as yet unascertained, the leptothrix colonies develop branches of a peculiar type, as shown in *Fig.* 100. To these they have given the name of 'bottle-brushes.' They consist of a few central threads with innumerable fusiform bodies, usually slightly curved, so set upon this stem as to resemble a fir-branch. Sometimes these fusiform bodies appear to be firmly attached to the branch, but in other specimens they may be watched coming off the axial threads in clouds, and in this condition they appear to be motile. They have often already divided into a diplobacillary form, while still attached to the stem. Branches are frequently found which have shed these bodies from their distal portions, but are still closely

beset with them lower down. In this condition the distal portion of the branch is covered with little coccoid bodies, which at a later stage appear to have budded off more coccus forms in the typical radiating rows, while the lower portion may still be covered with fusiform bodies. This fusiform bacillus appears to be the one associated with a spirochæte in Vincent's angina.

They believe *E. gingivalis* has no causal relationship with pyorrhœa. Its favourite habitat is the tartar, under the edge of which it can generally be found in greatest numbers. Hence it burrows, not into the tissues of the gum as stated by Bass and Johns, but between the branches of the leptothrix. It is not found in clean, healthy mouths, and they found it only once in ten or twelve cats with pyorrhœa in an advanced stage.

Kolle[2] claims to have discovered a special spirochæte, which he names *Sp. pyorrhœica*, from ninety cases examined. It measured 10 to 12 μ, had four to seven convolutions and definitely pointed ends, and could be found in quantities, and practically in a pure culture, by introducing a platinum needle into the deep pockets between the alveolar margin and the gum after the pus in these pockets had been squeezed out and wiped away. It stained deeply with gentian-violet, but only faintly with Giemsa. His belief that it plays the principal part in pyorrhœa is confirmed by the beneficial effect of the use of **Neosalvarsan** on the disease. A single intravenous injection of 0·1 grm. was sufficient to effect marked improvement, and in many cases two injections, each of 0·3 grm., cured the disease within ten days. Some of these cases had been refractory to various forms of local treatment. As many as three to five injections were required in severe chronic cases. The spirochæte decreased in numbers after the injections, and inflammation subsided; recovery was hastened by the local application of neosalvarsan.

Roddy, Funk, and Kramer,[3] from the examination of 506 bed and 1270 ambulant pulmonary tuberculous patients, show 80 per cent of these to be affected with pyorrhœa. They conclude that pulmonary tuberculosis predisposes to pyorrhœa, or that the same conditions favour both diseases. Further investigations showed there was no such relationship to diabetes, and that the incidence was not greater among syphilitic than non-syphilitic. Of eight patients of a gouty diathesis, none had pyorrhœa.

Of 97 patients with advanced pyorrhœa alveolaris, 40 presented one complication as follows: arthritis 18, gastric disturbance (anorexia, nausea, and eructations) 10, headache, lassitude, and anæmia 12. Two complications were presented by 20, as follows: recurrent tonsillitis and gastric disturbance 3; recurrent tonsillitis and arthritis 7; arthritis and fever 5; gastric disturbance, malaise, and fever 4; tonsillitis and cervical adenitis 1. Co-existing maladies which probably were complications were present in 12, but the connection could not be established; of these, 3 had recurrent earache, 4 neuritis, 2 albuminuria, and 3 furunculosis.

They claim that examination of slides, etc., prepared from 200 normal persons, 100 pyorrhœa patients, and 100 patients having gingivitis or oral sepsis, show clearly that: (1) There are variations in the total number of organisms present in the mouths of healthy persons; there is a maximum number compatible with health; when they are present in excess of this number, oral sepsis results. (2) The total number of bacteria in oral sepsis is far in excess of what is present in a normal mouth, more than 90 per cent of cases of pyorrhœa showing a bacterial flora indistinguishable from the flora of oral sepsis. (3) Washing the mouth and brushing the teeth with water or any dentifrice after meals will always reduce to normal an excessive bacterial flora. (4) Spirillæ and staphylococci are more frequently found, and form a larger proportion of the whole bacterial flora in pyorrhœa and oral sepsis, than in normal mouths, (5) The result of vaccine treatment suggests that staphylococci, diplococci, and streptococci are the most frequent causes of complications. (6) No legitimate distinction can be made between oral sepsis and pyorrhœa, oral sepsis being the first stage of the disease commonly referred to as pyorrhœa alveolaris. They agree that while a large number of organisms have been isolated, they cannot attribute a specific etiological rôle to any one.

It may be suggested that this is scarcely a legitimate use of the term 'oral sepsis.' Oral sepsis may be, and is often, associated with many acute pathological conditions, and these, when cured, are in most cases not followed by the chronic condition known as pyorrhœa alveolaris, and, per contra, pyorrhœa does, undoubtedly, sometimes commence in mouths in which there is no previous and obvious indication of oral sepsis, the teeth being sound and clean, in the ordinary sense.

Medalia[4] believes pyorrhœa to be due to a streptopneumococcus type of organism, that is to say, pneumococci in chains, which he says has been called *Streptococcus viridans*. He claims to have separated this, either alone or with one or more bacteria, in 189 out of 194 cases. He supports this view by quoting Rosenow,[5] who found a similar type of organisms in the joints and muscles of patients with rheumatism, apparently secondary to alveolar infections, by the results he claims from autogenous vaccines, and by his experiments in inoculating dogs with this organism. In the dogs, however, the inflammation of the gums resulting was not lasting, possibly due to the good general condition of the dogs and the lack of local mechanical irritation.

References.—[1]*Jour. Roy. Micros. Soc.* 1916, Dec., 513; [2]*Med. Klin.* 1917, Jan. 21 (quoted *Brit. Med. Jour.* 1917, ii, 265); [3]*N. Y. Med. Jour.* 1916, ii, 433; [4]*Boston Med. and Surg. Jour.* 1916, iii, 367; [5]*Jour. Amer. Med. Assoc.* 1913, i, 1223.

RABIES.

Herbert French, M.D., F.R.C.P.

Of the various modifications of Pasteur's method, the earliest was proposed by Högyes.[1] This is based on the fact that Pasteur's attenuation of cords by drying resulted only in a numerical destruction of the organisms. Högyes therefore devised a scheme of diluting fresh virus

and injecting increasing quantities from day to day. The use of this scheme has been followed by excellent results. Ferran advocated and used small quantities of emulsified fresh cord. Proescher injects a relatively thick emulsion of fresh brain, and gives fewer injections. Calette introduced the use of glycerol for preserving the cords. Fermi kills the organism by emulsifying the cord in 1 per cent phenol and injects this non-infective material. He claims his results are better than can be attained with the Pasteur method. Marie[2] in the Pasteur Institute gives the sensitized virus which has been acted on by antirabic serum. His results are better than those obtained in the institute before the adoption of this modification. Excellent results have followed the use of virus dialyzed according to the method proposed by Cummings.[3]

A modification of the Pasteur method described by D. L. Harris[4] is founded on Shackell's[5] very original investigations on the effect of *desiccation in vacuo* at a low temperature. This method has for its object the preservation of fixed virus, in order that it may be prepared in quantity and be always available for treatment. By using both brain and cord, enough material is obtainable for thirty complete treatments with the virus from a single rabbit; and, since the material can be stored until needed, there is no waste, and no unnecessary work is required of the laboratory staff during periods when patients are lacking or very few. Furthermore, with this product, treatment may be administered in less than half the number of days required by the original method.

The preparation of the material is as follows: Brain and cord, stripped of pia and blood-vessels, are ground in a mortar into a homogeneous, thick, paste-like mass; carbon-dioxide snow, collected from a tank into a sterile cloth, is added to the paste until freezing is complete and until further grinding reduces the mass to a fine powder. This powder is transferred quickly to a cold beaker and placed in a Schibler's jar which has been submerged in a mixture of salt and ice ($-18°$ C.). In the upper part of the jar is a beaker of concentrated sulphuric acid. A vacuum of less than 2 mm. is produced, and the powdered brain is kept at $-18°$ C. in the salt and ice until desiccation is complete. A single brain and cord will be completely dehydrated in from thirty-six to forty-eight hours. A more detailed description of the technique may be found in the published papers relating to this method.[6] If the brain and cord have been thoroughly ground, completely frozen, and absolutely dried at a temperature not above $-18°$ C., the resulting powder will be almost as infective as the fresh untreated brain and cord. When kept in vacuo at 0° C., there is no appreciable loss in infectivity for several months. When kept in an ice-box (8° to 10° C.) for 300 days this powder is five times as infective as an equal quantity by weight of Pasteur's cord that has dried five days.

Harris has used this material during the past four years in the treatment of patients, and has been able to collect data on 1159

patients treated with it. Of these cases, 359 were treated by himself, 222 in the State Board of Health Laboratory of Indiana by Dr. Wm. Shimer, and 618 in the Charity Hospital, New Orleans, by Dr. M. Couret. Of this number, one died during the treatment, and one fourteen days after the first injection. With these two exceptions, there were no deaths and no cases of paralysis. If we follow the example of Pasteur and exclude these two cases the mortality is zero. But excluding one death, in which symptoms developed on the tenth day during the treatment, and including the other, in which treatment had been completed but in which symptoms developed on the fourteenth day after the first injection, there is a mortality of less than 0·1 per cent, a result that compares favourably with any of the other modifications.

The minimal infective dose of desiccated brain and cord is $\frac{1}{250}$ mgrm., and one can easily inject many times the total infective doses usually contained in Pasteur's scheme with a much smaller proportion of foreign nerve material. Harris prefers to give 500 minimal infective doses, or units, at the first injection ; 1000 units at the second ; 2500 each at the fifth, sixth and seventh. In severe cases the daily dose after the fourth injection may be 3000. The usual mild case is treated in six or seven days ; severely bitten patients are treated ten to fifteen days. Mildly injured persons received from 7000 to 10,000 units. Dangerously bitten patients have received 30,000 to 70,000 units, or twenty times more than that given by Pasteur.

References.—[1]Lyssa, in *Nothnagel's Spez. Path. u. Therap.* Vienna, 1897 ; [2]*L'Etude Expérimentale de la Rage*, Paris, 1909 ; [3]*Jour. Infect. Dis.* 1914, xiv, No. 1 ; [4]*Jour. Amer. Med. Assoc.* 1916, ii, 923 ; [5]*Amer. Jour. Physiol.* 1909, xxiv, 325 ; [6]*Jour. Infect. Dis.* 1912, x, 369 ; *Ibid.* xi, 397, *Ibid.* 1913, xiii, 155 ; *Ann. de l'Inst. Pasteur*, 1912, xxvi, 372.

RAYNAUD'S DISEASE. *Herbert French, M.D., F.R.C.P.*

The difficulty of combating Raynaud's disease in other ways than by avoidance of exposure to cold is too familiar. One does not often hear, however, of treatment of the affected parts by **Massage,** the latter being applied, not only during the paroxysmal attacks, but also in the intervals between them. That massage, carefully carried out and assiduously persisted with, might lessen the severity of the attacks and thus relieve the patient seems not improbable ; and Graham[1] states that in his experience massage is beyond doubt *the* treatment in these cases.

Reference.—[1]*Med. Rec.* 1917, i, 402.

RECTAL SURGERY. *W. J. de C. Wheeler. F.R.C.S.I.*

Pruritus Ani.—Murray[1] finds streptococcal cultures in 94 per cent of these cases. He states that the pruritic condition can only be cured by the use of autogenous vaccine, which should be given in heavy doses. If piles are present, the pruritus may disappear after injection with glycerin and carbolic acid. (*See* Medical Annual, 1917, p. 449, and 1916, p. 298.) *X* rays have a beneficial effect in some cases.

Hæmorrhoids.—More attention should be paid to the treatment of this condition by injections, with a special needle through a suitable speculum, of glycerin and carbolic acid. The maximum strength should be 20 per cent, and very small quantities—two or three min.—into a large pile give the best results. When operation is indicated,

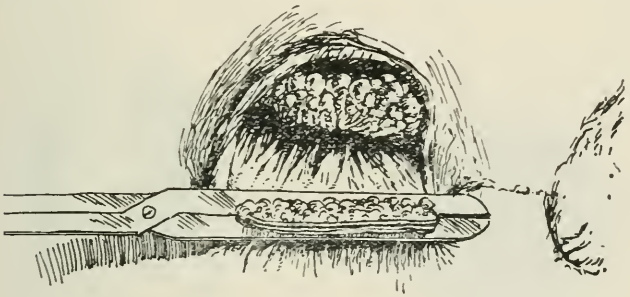


Fig. 101.—Operation for removal of piles. (*Wheeler.*)

(*Figs.* 101–104 *by kind permission from Wheeler's 'Operative Surgery.'*)

it can be readily performed in the manner illustrated,[2] the writer's modification of Mitchell's method for complete excision of the pile-bearing area. A short strong intestinal clamp is applied so as to include the pile-bearing mucous membrane and a very small portion of the skin of the anal canal, on one side of the anal circumference

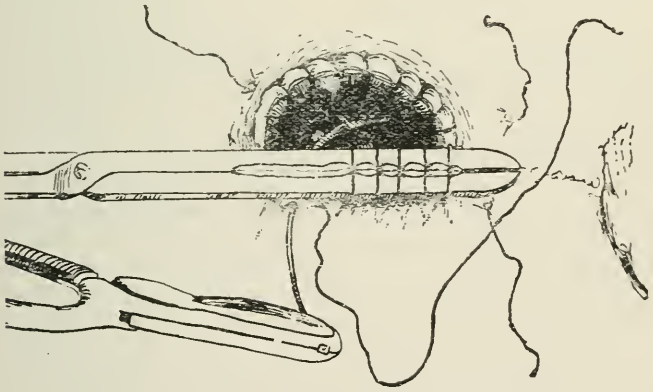


Fig. 102.—Operation for piles.

(*Fig.* 101). The piles are shaved off flush with the clamp, and a catgut suture applied. A Reverdin's needle set at right angles to the handle and threaded by an assistant renders the introduction of the catgut very rapid (*Fig.* 102). The operation can be modified by dividing the mucous membrane with sharp scissors at its junction with the skin of

the anal canal, separating off the pile-bearing area from the sphincter, applying the clamp, and then, after removal of the piles, introducing the sutures over the clamp as shown in *Fig.* 104. This insures the safety of the external sphincter.

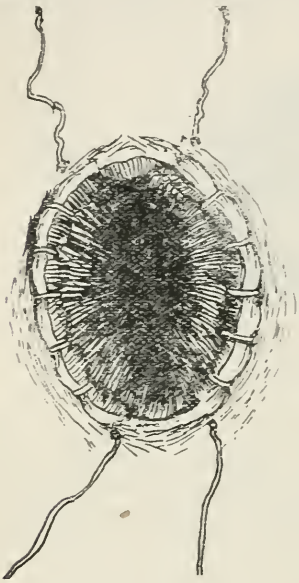


Fig. 103.—Operation for piles, completed.

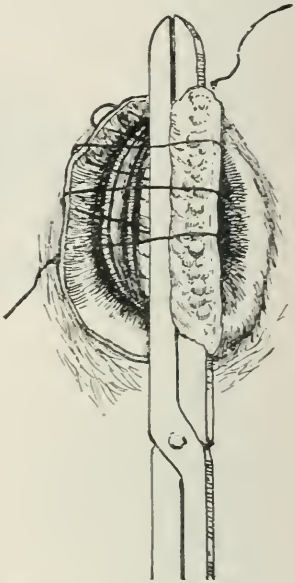


Fig. 104.—Operation for piles, modified.

The employment of **X-rays** in rectal affections (p. 46).

REFERENCE.—[1]*Ther. Gaz.* 1917, May, 370; *Operative Surgery*, Wheeler (Baillière).

RENAL FUNCTION TESTS. (*See also* NEPHRITIS.)

John D. Comrie, M.D.

A comparative study of various tests for renal function has been made by Mosenthal and Lewis,[1] who investigated, in 200 patients suffering from kidney affections, the condition as to excretion of phenolsulphonephthalein, the quantity of non-protein nitrogen and urea-nitrogen in the blood, Ambard's coefficient of urea excretion, and a simple test devised by themselves, which they call the '*test-meal for renal function*.' The last-named may be described as a two-hourly collection of urine during the day while the patient is on a full diet, and of a ten- to twelve-hour specimen at night. A normal test yields a maximum specific gravity of 1018, while the specific gravity may vary nine points or more from the highest to the lowest, and the night urine is small in amount—not more than 400 c.c. A lowering of the maximal specific gravity, a fixation of the specific gravity, and a nocturnal polyuria are the signs of a diminished renal function.

These writers regard the phenolsulphonephthalein test as the most useful, and find it is in close accord with the method by measuring Ambard's coefficient, in so far as the two show an equal degree of impairment in the renal function. As regards the methods of estimation by measuring the non-protein nitrogen and urea-nitrogen of the blood, they point out two important fallacies. One of these is the fact that the non-protein nitrogen is markedly altered by the dietary, so that in one of the cases a patient, who showed 145 mgrms. of non-protein nitrogen on ordinary diet, had a reduction to 32 mgrms. when placed on low diet. The other fallacy is that, owing to the increased protein catabolism which is associated with the terminal stages of nephritis, there may be a great increase in the blood-nitrogen without any immediately serious result. As regards this test, therefore, in forming a judgement as to prognosis one must always keep three factors in mind, viz., kidney efficiency, diet, and protein destruction.

The importance of renal functional tests in the *prognosis of surgical cases*, and especially in instances where there is found to be a minimal excretion of phthalein and indigo-carmine, is illustrated by Beer[2] from the records of a number of cases. He points out that in obstructive oliguria with very low excretion of these pigments and accompanying high blood-urea and high blood-content of incoagulable nitrogen, there is likely to be permanent renal damage, so that even the slightest operative interference, such as cystoscopy, may produce uræmia. He also draws attention to the fact that a low combined output from the two kidneys is sometimes caused reflexly by more or less extensive damage to one kidney only, and in this case, after its removal, the other (healthy) kidney improves in function.

In a discussion at the Medical Society of London upon the general subject of *war nephritis*, Adler[3] drew attention to the great usefulness of the phthalein test; he had found it to agree closely with the diastase test, and in some of these cases it had indicated impending uræmia before any ordinary clinical symptoms appeared. An important demonstration of the effect exerted by war conditions on renal function was made by McLeod and Ameuille.[4] They found that transitory albuminuria is very common amongst all troops, and that in the majority of cases it may be regarded as a phenomenon of fatigue. Thus, of troops who had been over six months in France, 4·73 per cent showed albuminuria, while an examination of the morning urine among men undergoing hard training in England revealed albuminuria in 10·12 per cent. They conclude that in a certain proportion of men, owing mainly to dietetic conditions, there is a slightly scorbutic state which depresses the renal function, and which, in addition, makes the kidney more than usually liable to contract nephritis when exposed to adverse influences.

The value possessed by the *chemical examination of the blood* as a test of renal function is estimated very highly by Chace and Myers,[5] who consider that increase of the uric acid and increase of the urea both form an important guide in the treatment of kidney disease.

They specially recommend, however, for prognostic value, the estimation of the blood-creatinin. They have found that cases with over 5 mgrms. to 100 c.c. invariably prove fatal within a short period, and that during the terminal stages of nephritis the concentration of creatinin gradually rises to 15 or 30 mgrms. at death. In a study of nephritis from the standpoint of *urea excretion*, McLean,[6] while he admits the correctness of the principles upon which Ambard's law is formulated, finds that the occurrence of a high concentration of urea in the blood is not necessarily accompanied by any symptoms suggestive of uræmia. Jonas and Austin,[7] however, as the result of a careful study of 30 cases, conclude that the Ambard formula does not express precisely the law of renal function as regards elimination of urea, especially in cases of arteriosclerosis and in cases with cardiac decompensation, and they believe that for clinical purposes the simple estimation of the blood-urea is a more reliable and useful guide.

The *excretion of hexamethylenamine* by damaged kidneys is not a test of renal function; but, since it has been denied that this substance, frequently given as a urinary antiseptic, passes through the kidneys at all when they are diseased, the matter has been carefully investigated by Smith.[8] He finds that formaldehyde appears freely in the urine even when the kidneys are diseased, and that therefore the administration of hexamethylenamine is just as valuable in these cases as it is when the kidneys are healthy.

References.—[1]*Jour. Amer. Med. Assoc.* 1916, ii, 933; [2]*Ann. Surg.* 1916, Oct., 434; [3]*Pract.* 1917, Feb., 130; [4]*Lancet*, 1916, ii, 468; [5]*Jour. Amer. Med. Assoc.* 1916, ii, 929; [6]*Ibid.* 1917, ii, 437; [7]*Amer. Jour. Med. Sci.* 1916, ii, 560; [8]*Boston Med. and Surg. Jour.* 1916, ii, 569.

RETINA, DISEASES OF THE. *A. Hugh Thompson, M.D.*

It is twenty years since the late Marcus Gunn read his paper "On Ophthalmoscopic Evidence of General Arterial Disease,"[1] in which he expressed the view that certain visible primary changes in retinal arteries are "very commonly, if not constantly, a part of a similar, more general, and therefore more important, change in small arteries elsewhere." These changes were: (1) Variation in the calibre of the vessels, local dilatations or contractions; (2) Unusual tortuosity in their course; (3) An exceptionally narrow and bright central reflex from the vessels, especially in the secondary and tertiary branches of the central artery, an appearance generally known as 'silver-wire arteries'; (4) Loss of translucency, so that at a point where an artery crosses a vein the walls of the latter are invisible—an abnormal condition, at any rate in the eyes of the young; (5) Interference by the pressure of an artery with the blood-stream in a vein where the latter is crossed; (6) Œdema, or even hæmorrhage, in the retina.

Ever since Gunn published his paper his signs have been constantly looked for and frequently found, and it has been generally held that these retinal changes afford a valuable indication of the condition of the cerebral vessels, and a correspondingly important indication of

PLATE XLVI.

ARTERIOSCLEROTIC RETINITIS

the prognosis of life in these cases. Two papers, published last year, help to throw further light on the subject. One is by Bardsley,[2] himself a pupil of Gunn's. He gives good clinical evidence for the opinion that some of the above signs are not necessarily any indication of arteriosclerosis, or of anything beyond a mere temporary rise of blood-pressure. The following, according to him, are the distinguishing characteristics of simple high tension: (1) The vessels have an appearance of *uniform* distention and fullness. (2) The light streak is *broadened* out; it may be greatly increased, apparently reaching almost the whole breadth of the vessel. (3) The light streak is very much brighter than normal, the brilliancy increasing with the increase of tension. (4) The tight arteries indent the veins: with medium high tension they indent them slightly; but with very high tension they indent them deeply, leading to back-pressure and all its consequences. All these signs may be present in cases of high tension, and disappear on the return of the blood-pressure to normal. On the other hand, the following signs indicate sclerosis: (1) *Irregular* tortuosity, especially of the smaller twigs. (2) Increased brilliancy of the light streak, while at the same time it appears *narrower* and more central. (3) Irregularity of calibre and *beading* are sure indications of sclerosis. These two conditions of high tension and arteriosclerosis do, of course, very frequently coincide, but not by any means always. The latter is incurable, but the former may be transient. The paper is an important contribution to the true interpretation of Gunn's signs.

Another pupil of Gunn's, Foster Moore,[3] writing on the same subject, differs from Bardsley, believing that the signs of obstruction of the blood-flow in the veins where they are crossed by arteries necessarily indicate arteriosclerosis. The particular sign on which he lays most stress is one just mentioned by Gunn but not generally emphasized, viz., the displacement of the line of the vein just where an artery passes either under or over it, so that while the general direction of the two vessels are at an angle with each other, for a short space on either side of the actual crossing they are parallel. The condition is well illustrated in *Plate XLVI*, reproduced from Foster Moore's paper by the kindness of the Royal Society of Medicine. (This plate was taken from the left eye of a woman of sixty-five, who subsequently had a stroke. It shows bright arteries which are also somewhat tortuous. In one place a small artery is converted into a fibrous-looking thread. A number of spots of exudation are present. The veins are engorged, tortuous, and severely cut into and displaced where they are crossed by the arteries. At one place just below the disc a vein is seen riding over a small artery. There was no retinal exudation in the other eye.) That a similar condition, however, may be due to causes other than arteriosclerosis is proved by a case now under the observation of the writer, in which it exists along with well-marked engorgement of the veins in one eye of a patient recovering (after operation) from the effects of an arteriovenous aneurysm of

traumatic origin. In addition to the changes already mentioned, Foster Moore points out that retinal hæmorrhages, both small and large, are exceedingly common with arteriosclerosis. They become absorbed in time, the period varying with their size and density, and usually leave no trace behind them ; but in the case of large hæmorrhages a number of minute white dots may remain scattered thinly over the area.

In advanced cases arteriosclerosis may give rise to thrombosis of the central vessel or one of its branches, causing sudden complete or partial blindness of the eye from obstruction of the blood-flow. It may also, in a case where the sclerosis is well marked and progressive, but not sufficient to cause actual thrombosis, lead to a gradual deterioration of vision, with optic atrophy and restricted fields. The cause of this is doubtless that the diminished lumen of the vessel is unable to transmit an efficient supply of blood to the retina. It is a result of arteriosclerosis hitherto not generally recognized, but Foster Moore gives several examples of it in this paper, with reproductions of the restricted fields.

When to a condition of retinal arteriosclerosis there is superadded the presence of retinal exudation, the case, according to Foster Moore, becomes one of *arteriosclerotic retinitis.* These exudates take the form of small white dots, spots, or small areas, a large dot being equal in diameter to a large retinal vein. They are sharply defined, there is no ophthalmoscopic evidence of surrounding œdema, and no pigmentary disturbance in their neighbourhood. They are slow to develop and slow to change ; but they do change, and in time may completely disappear. Histologically they are composed of round or oval masses of exudate indistinguishable from that seen in some cases of renal retinitis, and, like it, situated entirely in the internuclear layer. Whereas, however, in renal retinitis both eyes are nearly always affected, in arteriosclerotic retinitis the changes may be confined to one eye. The patches of soft-edged woolly exudation that are seen in acute renal retinitis, and which are due to exudation in the superficial layers of the retina, are not seen in the arteriosclerotic variety. The contention of Foster Moore that this form of retinitis is an entity calling for separate recognition is justified by the fact that in it the prognosis as to duration of life is so much better than in the renal form. At the same time, since cases of the former sometimes develop into the latter, no hard-and-fast rule can be drawn.

As to the *connection between retinal and cerebral vascular disease,* Moore examined the fundi of 44 patients admitted to the wards of St. Bartholomew's Hospital suffering from hemiplegia, diagnosed as being due to cerebral vascular disease. In 13, or 30 per cent, the fundi were normal ; in 12, or 27 per cent, they gave evidence of mild or moderately severe vascular disease ; and in 19, or 43 per cent, they showed severe disease. He also followed up as far as he could a number of patients who had been diagnosed as suffering from retinal vascular disease in the out-patient department at Moorfields

Eye Hospital. Of 26 of these patients who died, and in whom the cause of death could be ascertained, in 12 this was due to a gross vascular cerebral lesion. Of 46 others of these patients, 21 had either suffered from a gross cerebral vascular lesion at the time when their eyes were examined, or developed one in the course of about three years. These observations confirm the belief that the connection between retinal and cerebral vascular disease is a very close one. On the other hand, they also show that, compared with renal retinitis, the prognosis as to length of life in simple retinitis may be comparatively favourable.

References.—[1]*Trans. Ophth. Soc.* 1898, xviii, 356; [2]*Proc. Roy. Soc. Med.* (*Ophth. Sect.*), 1917, July, 27; [3]*Quart. Jour. Med.* 1917, Jan., 29.

RHEUMATISM.

The effect of **Salicylic Acid** in cases of rheumatic fever (p. 26): injections of **Colloidal Sulphur** useful in chronic articular rheumatism (p. 31).

RHINOPHARYNGITIS MUTILANS. (*See* Gangosa.)

RICKETS. *Frederick Langmead, M.D., F.R.C.P.*

By the examination of 1000 Jewish school-children attending the London County Council Schools, J. Lawson Dick[1] found that 80 per cent of them showed distinct evidence of rickets. As a rule the general nutrition was good, but over 80 per cent of them had been breast-fed for from twelve to eighteen months. He especially studied rickets in its relation to dentition and dental defects. Nowhere was the disturbance of calcium metabolism more apparent than in the teeth. He finds that caries is exceedingly common, and hypoplasia or defective calcification of the enamel well marked. Hypoplasia is characterized also by stunting of the growth of the teeth. There may be only pitting of the enamel, producing a honeycombed appearance, or the enamel covering may be slight, so that the cutting edges of the teeth present sharp points. The defect usually extends from the edge, and may involve the whole crown in severe cases. These changes are characteristic of the permanent teeth.

The calcification of the teeth begins about the fifth month of intrauterine life, and *Figs.* 105–107 show the rate of its progress at various periods in the teeth of both the first and second dentition. The only teeth of the permanent set which show signs of calcification at birth are the cusps of the first molars. *Fig.* 107 depicts the portion of the enamel which has calcified at the end of the first two years of life, and the parts affected by the commonest form of hypoplasia. In its most characteristic form the teeth affected are the central and lateral incisors, the tips of the canines, and the crowns of the first molars. The condition is symmetrical and affects both jaws. Usually the depth of the defect is greater in the enamel of the central incisors than in that of the lateral. The enamel affected is identical with that

laid down during the first two years, and rickets is the only condition which interferes with the deposition of calcium over this prolonged period. In contrast with this are the grooves which register the occurrence of some grave and prolonged illness, especially measles followed by whooping-cough.

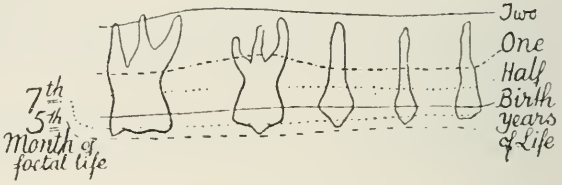


Fig. 105.

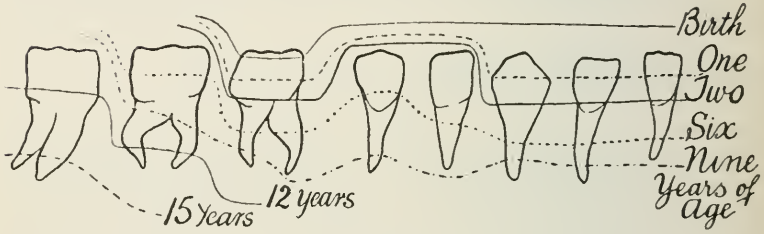


Fig. 106.

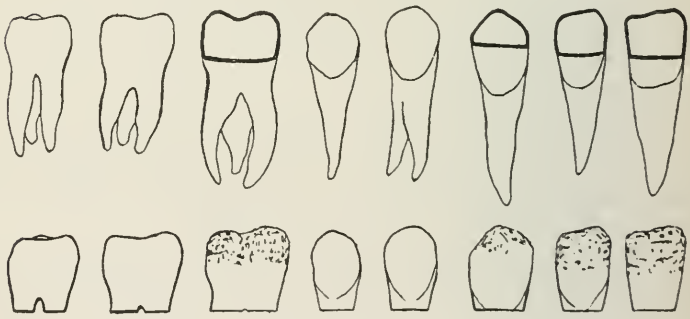


Fig. 107.

Figs. 105–107.—Showing the calcification of the teeth at various periods (*J. Lawson Dick*).

Hypoplasia due to congenital syphilis is rare, whilst the form due to rickets is exceedingly common in school-children. In judging of its presence it was found to be practically impossible to make accurate observations on the temporary teeth of infants of school age because of the amount of caries met with. Consequently, only records of the permanent dentition were available for statistical purposes, and only

the severer forms were admitted. Of 586 rickety children of whom a record of the permanent teeth could be taken, 42 per cent had normal, and 52 per cent defective, teeth ; 20 per cent of these showed hypoplasia, frequently combined with decay, and 38 per cent had decayed teeth. This is not equivalent to finding 42 per cent of school-children with normal teeth, for defects of the temporary teeth do not appear. Again, most of the children were between the ages of twelve and thirteen, when nearly all the permanent teeth have erupted and little time has elapsed during which decay could take place.

Of the cases of carious teeth, the lower first molars were decayed in 80 per cent, and much more frequently than any other teeth. He attributes this to the fact that the main part of the enamel of the crowns of these teeth is laid down during the rickety period—the first two years of life. Careful search for a hypoblastic condition of the milk incisors failed to reveal a single case which is strong presumptive evidence that rickets is not a congenital condition, and that whatever the state of the mother, the germ is protected during intra-uterine life.

Treatment.—Shabad,[2] who is in charge of the children's clinic at Petrograd, has been conducting an extensive research into rickets. In the course of this investigation he has compared the result obtained by giving the mixed diet containing very little milk advocated by Czerny and Keller with those following the diet of unlimited milk with bread. The intake and output of calcium, phosphates, and nitrogen were carefully compiled and compared. All the evidence was in favour of unlimited milk with bread. The children assimilated and retained **Calcium** better, and gained in weight ; all the metabolic findings were more nearly normal. The results were still better when a teaspoonful of **Cod-liver Oil** twice a day was added. With the Czerny-Keller mixed diet, consisting of 241 grms. of milk, 247 grms. of soup, 512 grms. of tea, 138 grms. of bread, 85·5 grms. of cutlet, and 332·2 grms. of mashed potatoes daily, there was also improvement when cod-liver oil was added. Shabad considers that the investigation shows that the mixed diet lacks essentials, and is not as well utilized as plain milk and white bread.

A. Withers Green writes of the good effects in one case of administering **Eggshell Water**. It was prepared by placing the shells of 20 eggs in a saucepan with 2 to 3 pints of water, boiling, and then simmering for twelve hours. Afterwards the fluid was strained and poured into a clean bottle as stock. The result is a clear solution like albumen-water. Two teaspoonfuls of this are added to the milk of each bottle for a baby six months old, and the amount is afterwards increased according to age.

References.—[1]*Med. Press and Circ.* 1917, April, 309 ; [2]*Russkij Vratsch*, Petrograd, 1916, xv, No. 45, 1067 (abstr. in *Jour. Amer. Med. Assoc.* 1917, Mar., 1815).

RINGWORM. (*See* Tinea Barbæ.)

RINGWORM, ECZEMATOID. *E. Graham Little, M.D., F.R.C.P.*

This subject has attracted considerable attention during the past year, owing, no doubt, to its increased prevalence in the community, and especially in the Army. Ormsby and Mitchell[1] contribute a very full historical and bibliographical paper, and give an analysis of 65 patients affected with the disease under the care of the authors. Of these, 54 were men and 11 women, a ratio which confirms European experience of the much greater prevalence in males. The age of the patients varied from nine to fifty-four years, the duration of the disease from one week to twenty years; in no less than 7 cases the duration had exceeded ten years. A curious seasonal variation was noticed, the largest number occurring in summer, and there can be little doubt that a large proportion of the cases diagnosed as dysidrosis even by skilled observers are really instances of ringworm. Probably the symptoms are always accentuated in warm weather. Their severity differs much, some persons being completely incapacitated, others hardly inconvenienced. The feet were involved in 60 out of the 65, the hands in 23. Itching was a prominent symptom in six-sevenths of the cases.

The demonstration of the organism, which is the convincing proof of its responsibility for the disease, is often difficult, and the authors advise the following measures. A recent vesicle, if present, should be selected, and the roof removed with a sharp knife; the portion so taken should be inverted on a slide covered with 15 per cent potassium hydroxide, and a cover-slip placed over it. It should then be boiled. The cover-slip is pressed on the slide until the sodden epithelium is flattened into a smear on the slide. Scales may be treated in the same way when vesicles are absent. The spores are found in chains—never in groups—and are somewhat quadrilateral in shape. Interspersed with the chains of spores a much finer mycelium is found running in all directions.

The treatment recommended comprises the application of one or other of the three following preparations :—

(1) ℞ Naftalan, Zinc Ointment, and Starch (proportions not specified).

(2) ℞ Salicylic Acid 2 parts | Ointment Base 30 parts
Benzoic Acid 4 parts |

(3) ℞ Chrysarobin Solution in Chloroform (5 per cent) thickened with Gutta-percha. (To be painted on the part and allowed to dry *in situ*).

Graham Little[2] draws attention to the curious circumstance that this parasite is not easily conveyed to young children, in striking contrast with our experience with other forms of ringworm and favus. He ascribes the special chronicity of the disease in the foot to reinfection from floor coverings, which usually escape attention when the other fabrics with which the patient may have come in contact are disinfected, and the sterilization of footwear, and especially bedroom slippers and rugs, should be insisted upon.

Macleod[3] recommends in the earlier acute stages the continuous application of boric compresses, followed by the use of a dusting powder consisting of :—

℞	Acid Salicylic	1 part	Zinc Oxide	4 parts	
	Boric Acid	1 part			

Later, an ointment may be applied twice daily of the following composition :—

℞	Pyrogallol Oxidat.	gr. xv	Paraffin. Moll.	ad ℥j
	Glycerin of Starch	℥ij		

For the chronic disease in the toes a saturated solution of **Salicylic Acid** in spirit may be required. For fissures, painting with **Friar's Balsam** or with 2 per cent **Nitrate of Silver and Spirit Lotion** is recommended. The parts, even after all trace of the disease is removed, should be painted over several times a week for at least a month with 10 per cent **Tinct. Iodi** in spirit.

Adamson[4] recommends the following treatment. Where there is vesication, the parts should be fomented with hot water, and this ointment rubbed in :—

℞	Acid. Benzoic.		Ol. Coca-nucis	℥iij
	Acid. Salicyl.	āā gr. xv	Vaselin.	ad ℥j

If there are any resistant patches of disease left, the affected areas are to be mopped over with **Tinct. Iodi,** and rubbed with **Argent. Nit.** gr. 10 to **Spt. Æth. Nitrosi** 1 oz. This application may be repeated at intervals, the ointment prescribed above being used in between.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1916, lxvii, 711 ; [2]*St. Mary's Hosp. Gaz.* 1916, Dec., 124 ; [3]*Pract.* 1917, i, 146 ; [4]*Lancet,* 1917, i, 221.

SALPINGITIS. *W. E. Fothergill, M.D.*

From a study of more than 500 cases in which the post-operative and remote results of surgical intervention in pyogenic infections in the Fallopian tubes were considered, Clark and Norris[1] conclude that a course of conservative preparatory treatment decreases mortality, and enhances the chances for securing a good functional restoration of the pelvic organs.

In all cases of acute infections of the Fallopian tubes, the patient should be kept under observation until the course is defined. (1) In the greatest majority the temperature subsides, the pain disappears, the tubal enlargements decrease to impalpable proportions, and, if the attack is a primary one, the patient may be given a respite from operation until a recurrent attack supervenes. Even under these recurrent conditions the conservative policy is again pursued until subsidence takes place a second time, when an abdominal operation is advised, with a view to treating existing conditions to the best possible advantage. Usually both tubes are removed, and the ovaries are conserved. (2) If, under the conservative plan, the symptoms do not

abate and the tube continues to enlarge, vaginal drainage is instituted, either by direct incision into the cul-de-sac or through the guidance of an abdominal incision.

In the purulent lesions of the tube, all operative procedures are attended with a higher mortality and a greater morbidity, whereas under a conservative waiting treatment a patient will seldom die during an acute infection. In the authors' series there was no death. In all hazardous cases the increasing severity of the symptoms and the enlargement of pelvic masses give ample warning, and permit of a simple drainage operation that will tide the patient over the danger.

When the acute attack has subsided, the surgeon has the best opportunity for ascertaining, during the course of an operation, the exact degree of involvement of the tissues, and thus he is enabled to select the type of operation best suited to the individual patient.

Conservative operative procedures with a view to restoring a closed Fallopian tube seldom restore fecundity. Plastic operations upon the fimbriated extremities of the Fallopian tubes, with the same object in view are almost invariably failures, and necessitate additional operations. Clark and Norris believe, therefore, that the safer policy usually is to remove the tubes by a wedge-shaped cornual excision in all doubtful cases, thus disregarding any attempt at restoration of fecundity.

Hystero-salpingo-oophorectomy in sexually mature women, the subjects of chronic infections of the uterus and adnexa, is followed by a lower mortality and a greater certainty of restoration to health than are possible after conservative operations. Therefore conservative operations employed with a view to preserving ovarian tissue should be limited chiefly to women under thirty years of age.

Gonorrhœal Salpingitis.—P. Brooke Bland[2] considers treatment of gonorrhœal salpingitis, by whatever method, should be essentially economic or conservative, and in the acute stage, unlike acute infections in other organs of the body, this is best served by first instituting medical measures and not by applying hasty or meddlesome surgery. By medical means we shall be able to reduce the morbidity, decrease mortality, frequently avoid mutilating surgery and sacrificial operations, and therefore often conserve anatomical structures with retained function.

The question of when to operate is a very vital one, but in all first attacks during the acute stage, early surgical intervention is not indicated, and its employment is vicious and meddlesome. In cases of repeated exacerbations of an old infection, medical treatment will only avail in a small number of instances, and in these surgery should be resorted to. The teaching concerning the surgical treatment of acute pelvic inflammation to "wait until the temperature reaches normal and then operate" is wise instruction, but it does not completely cover the premises. With the fall of temperature, or during, as it were, the afebrile stage of the disease, nature's therapeutical agencies are just becoming operative. Give them a chance. Wait

until the temperature reaches normal, and then still wait, for in so doing one may avoid a dangerous and mutilating operation and preserve structures with powers of future function.

References.—[1]*Surg. Gyn. and Obst.* 1917, ii, 33 ; [2]*N.Y. Med. Jour.* 1917, i, 1012.

SARCOMA OF SKIN. (*See* Skin, Sarcoma of.)

SCABIES. (*See also* Skin Diseases in War.)

E. Graham Little, M.D., F.R.C.P.

Adamson[1] has a useful article on the treatment of this disease, primarily in the Army. He points out the frequency with which the symptoms of scabies are masked by a secondary impetigo or eczema, and associated with ecthymatous and furuncular lesions. The eczema is too often the result of intemperate applications of sulphur for scabies. The treatment recommended is as follows : An ointment, consisting of equal parts of **Soft Soap** and **Ung. Sulph.** of the B.P. is prescribed in sufficient quantity for three applications. A **Hot Bath** of half an hour's duration is taken on three consecutive days. During the bath the body and limbs, especially the hands and wrists and buttocks, are scrubbed with soft soap by a flesh brush. After each bath the patient himself rubs in the ointment and puts on an old sleeping-suit, gloves, and socks, and goes to bed, where he remains until it is time for the bath on the next day. The baths and inunctions must on no account be continued beyond the three days. The patient gets up and dresses after this period, and usually requires no further treatment, but is kept under observation for another three days. If, as sometimes happens, some itching continues, he is given the following lotion to mop on night and morning.

℞ Liq. Picis Carb. ℥j | Aq. ℥xx

If the treatment has been thoroughly carried out, the patient is cured and free from infection after the three baths and inunctions. If a case is not cured in this way, it is probably not scabies, but either a *papular urticaria* or *chronic eczema*. For the former affection a lotion of ordinary **Vinegar** is often efficacious. For the eczema a **Zinc Ointment** as follows should be freely applied and all baths forbidden :—

℞ Zinci Oxidi Vaselin. ad ℥x
Pulv. Amyli āā ℥j

Montgomery[2] recommends as a substitute for sulphur in the treatment of scabies in infants (in whom this treatment often produces secondary dermatitis) the following formula :—

℞ Creolin 10 parts | Adip. Benz. 100 parts
Sapo. Virid. 30 parts |
Ft. Ung. To be rubbed in once a day.

The soap may be omitted if it causes irritation or excessive drying of the skin.

Clark and Raper[3] made some experiments in the treatment of scabies with **Chlorine Gas**, which has the advantage that it is easily procurable with the armies at the front, and requires no apparatus other than the respirators supplied to the troops. The results are not on the whole very encouraging, and certainly do not compare well with the effects of **Sulphur** properly applied. The duration of the treatment is appreciably longer, considerable irritation is left after the acarus is eliminated, and the 'cure' is much more uncertain.

Whitfield[4] reports a case of *infection of human beings from a kitten*, the acarus being demonstrated in the scales of a scurfy patch present in the latter. Infection of human beings by scabies from cats is probably rare, and the symptoms noted in this instance are therefore worth recording. The eruption, which was like a varicella on a very small scale, was distributed on the forearms and upper arms, the thighs, the breast but not the nipples, the abdomen and the scalp but not the face. In a second case the distribution was similar, but the scalp was not affected. Pruritus was intense, but not particularly worse at night. The precise type of the acarus found in the kitten appears doubtful, as the author says it was neither the human variety nor the *Sarcoptes minor* of the cat. Treatment on ordinary lines speedily resulted in cure.

References.—[1]*Lancet*, 1917, i, 221 ; [2]*Amer. Jour. Med. Sci.* 1917, i, 141 ; [3]*Brit. Med. Jour.* 1917, ii, 113 ; [4]*Proc. Roy. Soc. Med.* (*Derm. Sect.*), 1916, Nov., 11.

SCARLET FEVER. *E. W. Goodall, M.D.*

D. M. Lewis,[1] of New Haven, Conn., claims that by a careful microscopic examination of cultures from swabbings of the throat a diagnosis of scarlet fever or of scarlet-fever carriers can be made in the majority of instances. He claims that a certain streptococcus is present, which differs in the arrangement of the chains from other cocci. In the drawing he gives, this coccus appears in very long curved chains, and the individual cocci are also rather large. He does not claim that this organism is the cause of the disease, even though it is so frequently present.

M. J. Synnott[2] records a case of very severe scarlet fever, of a mixed septic and toxic character, in a woman, age 30, which was successfully treated by intramuscular injections of the **Serum** of blood taken from a convalescent scarlet-fever case three months after the attack. Five ounces of the citrated serum were given on the third day of the disease, and two further doses of $2\frac{1}{2}$ ounces each in the course of the next day. An improvement was noticed soon after the first dose, and was maintained steadily during the next three days, at the end of which the temperature was normal and the patient convalescent.

References.—[1]*Boston Med. and Surg. Jour.* 1917, i, 170 ; [2]*Med. Rec.* 1917, i, 106.

PLATE XLVII.

SCHAMBERG'S DISEASE

E Graham Little

SCHAMBERG'S DISEASE. *E. Graham Little, M.D., F.R.C.P.*

This is a rare disorder of the pigmentation of the skin, first described by Schamberg, in 1901, characterized by the appearance of reddish-brown patches and punctate macules, usually on the legs below the knees, and rarely elsewhere. Graham Little reported the first case to be observed in this country,[1] and a second case in 1914. Adamson,[2] collecting these cases and reporting a new one of his own, points out that all the examples of the disease, some six in number, have been in males, the ages varying from eleven to fifty-six. All observers have described the affection as consisting of yellowish-brown or brownish patches or macules, with outlying red or reddish-brown or cayenne-pepper-like punctæ. Some have described these as telangiectatic points, others as pigmentary deposits. The histological reports have also varied greatly, and there is no agreement as to the pathology. Adamson, having failed to find, as also did Graham Little, the special infiltration of the sweat ducts suggested by Schamberg, summarizes his conclusions thus: Schamberg's disease is a slowly progressing inflammatory infection. There is a dilatation of blood-vessels, together with localized areas of cell-exudation or proliferation. The pigmentation is not due to blood changes from purpuric hæmorrhage, but to the spindle-shaped collection of pigment-granules observed in the hæmatoxylin-stained sections. That 'stasis' is not necessarily a factor in its causation is shown by the fact that it has occurred upon the forearms as well as upon the legs. The symmetrical distribution on the arms and legs, and the histological findings, distinguish the lesions from those of angioma serpiginosum.

Plate XLVII is drawn from Graham Little's first case, in a boy, age 12, who had suffered from the eruption for about two years. There were symmetrical patches below each knee. The surface was rough and divided by numerous minute furrows into lozenge-shaped areas, the size of a small pin-head. At the margins of the larger patches were several punctate red spots like cayenne-pepper grains. There were no subjective sensations.

References.—[1]*Brit. Jour. Derm.* 1902, 266; [2]*Proc. Roy. Soc. Med.* 1916, Nov., 1.

SCHISTOSOMIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

J. R. Risquez[1] records having found the ova of *Schistosoma mansonii* in very large numbers in the intestinal mesenteric glands. E. L. Atkinson[2] records his experience of *Schistosoma japonicum* during his investigation with R. T. Leiper.

References.—[1]*New Orleans Med. and Surg. Jour.* 1917, May, 758; [2]*Jour. R.N. Med. Service*, 1916, Oct., 485.

SCLERODERMIA. *E. Graham Little, M.D., F.R.C.P.*

Ravogli[1] undertakes a general review of this subject while reporting a very anomalous instance of it, with extensive but circumscribed patches of the disease. On the legs there were numerous chronic ulcerations of the affected skin. The disease had begun acutely

in a vigorous man of thirty-two, who, while following his occupation of policeman in a private lumber yard, got thoroughly wet, and remained in his wet clothes for several hours, suffering a severe chill. This was followed by pains all over the body, which were ascribed to rheumatism, and a short time after sclerodermic patches appeared, at first on the elbows, and later as wide stripes down the arm to the wrist. Similar patches also developed on the thighs, knees, and legs, and in these positions the skin ulcerated over wide areas. The ulcers were treated with **Bichloride of Mercury**, 1–2000 solution, as a wet dressing, twice daily, and were covered with **Benzoated Oxide of Zinc Ointment**, containing about 4 per cent of **Calomel.** The patient was advised to take small doses of calomel, twice a day, and saturated solution of **Potassium Iodide** after each meal. Under this treatment the patient improved and the ulcers healed.

Acute onset of the disease as the apparent result of chill has been frequently observed. Disturbances of the secretion of internal glands has often been invoked to explain the onset of sclerodermia, but there is no agreement as to which specific gland is concerned. Ravogli regards the conditions described under the names of angioneurotic œdema, sclerodermia, and Raynaud, as forms of a disease essentially of the same etiology, and favours the view that disturbances of pituitary function are the true cause of sclerodermia. He states that he has never had any promising result with thyroid administration, and in fact finds that better effects are obtained with **Iodides.** He suggests that syphilitic and tuberculous disease of the hypophysis is not uncommon, and may explain some of the cases. Other authorities regard deficient adrenalin and thyroid secretions as predisposing causes.

Macleod[2] records a case of sclerodermia with pigmentation and warty growths about the elbows, axillæ, groin, and neck. The condition of sclerodermia was preceded by a diffuse œdema, and finally became nearly universal, only the scalp and a small area surrounding the umbilicus remaining unaffected. The hair was lost from the eyebrows, eyelids, eyelashes, pubes, and axillæ. He proposed to treat the case with thyroid. In the discussion which followed the exhibition of this case, the trial of Martindale's 'four-gland tablet,' consisting of 1 gr. each of **Thyroid, Thymus, Suprarenal,** and **Pituitary,** was recommended.

References.—[1]*Jour. Cutan. Dis.* 1917, Jan., 1 ; [2]*Proc. Roy. Soc. Med.* 1917, Jan., 60.

SCURVY, INFANTILE. *Frederick Langmead, M.D., F.R.C.P.*

A. F. Hess[1] believes that in America the use of pasteurized milk is the chief cause of scurvy, and that it induces a type of the disorder which generally goes unrecognized, but is prevented if an antiscorbutic substance be given in addition. This form he names 'subacute infantile scurvy.' The baby, who is usually in the second half of the first year of life, fails to gain weight, or gains very little for weeks. It

may be fairly well nourished, but is pale, with perhaps slight œdema of the eyelids. It is irritable and peevish, and loses appetite. The gums may show merely a lividity or slight hæmorrhage, amounting only to a rim of crimson fringing the upper gum, or situated only behind the upper incisors. Closer examination may reveal congestion of the papillæ of the tip of the tongue, a petechial spot on its frænum, with perhaps a few others on the palpebral conjunctivæ, or scattered about the body, especially where there are erosions, eczema, or other skin lesions. The tenderness of the lower parts of the thighs is often fleeting and indefinite. There may be a slight œdema over the crests of the tibiæ, which does not pit on pressure. The knee-jerks are usually exaggerated. The urine may be normal or contain albumin and red and white blood cells. This group of symptoms does not constitute a definite clinical syndrome, but is subject to many variations. In addition, the heart is often enlarged, especially to the right, an enlargement which may be detected by percussion, and may occasion diminished air-entry at the pulmonary bases. A skiagram shows this increase in breadth of the heart, and also a marked broadening at its base at the site of the large vessels. Other signs upon which he lays stress are a rapid pulse and rapid respirations. The pulse-rate may be as much as 200 per minute in quite mild cases. The respiratory rate is perhaps a more delicate indicator than the pulse, and has been found to be markedly accentuated when the pulse has only slightly quickened; in one case the pulse-respiration ratio was 2 to 1. A sharp drop occurs in both the pulse and respirations when orange-juice is given, proving the significance of those signs. In one case he mentions that a mild fever also subsided with antiscorbutic diet, and he regards the disease therefore as capable of producing a 'scorbutic fever.'

Cardiographic tracings showed that the rapid pulse-rate indicated a simple tachycardia. The increase in the respirations is a polypnœa rather than a dyspnœa, the child showing no visible distress or disturbance in its breathing. He regards these signs—the tachycardia and polypnœa—as nervous in origin, and probably vagal, since they cannot be attributed to primary muscular alteration, nor do they bear any relation to the degree of anæmia. The recognition that the nervous system is affected in scurvy brings it into closer relation with pellagra, beri-beri, and the ever-increasing group of disorders classed as deficiency diseases.

Previous to the onset of scurvy there must be a period during which the equilibrium of the vitamine is no longer being maintained. At first this is of little consequence, but if continued, a condition of 'latent scurvy' arises which may persist, may be cut short by the administration of antiscorbutics, or may proceed to subacute or florid scurvy. The diagnosis of latent scurvy is based mainly on the reaction to specific therapy or the marked improvement which follows the use of **Orange-juice,** potato, or other antiscorbutic food. The symptoms alone do not warrant a definite diagnosis, but the history

of a diet of heated milk and lack of antiscorbutic food, considered in conjunction with the pallor and lack of appetite, the increased knee-jerks, and perhaps the cardio-respiratory syndrome, is sufficient to suggest the prescribing of orange-juice, which proves remarkably beneficial. Latent scurvy, he thinks, is probably the commonest type of the disorder, especially in the larger cities where the entire milk supply is pasteurized. The moral which he inculcates is not that fresh milk should not be pasteurized, but that antiscorbutics should be given regularly at an earlier age than it is customary to do.

G. A. Rueck[2] records a severe case of scurvy in a child ten months old which he treated with two transfusions of **Citrated Maternal Blood.** On each occasion he used 150 c.c. of maternal blood mixed with 2 per cent sodium citrate solution in the proportion of four parts of blood to one of the solution. The treatment, which was employed because the child would take no food and his condition appeared desperate, proved successful.

References.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 235; [2]*Med. Rec.* 1917, i, 152.

SEVEN-DAY FEVER. (*See* Dengue.)

SHELL SHOCK. *J. Ramsay Hunt, M.D.*

The various functional neuroses produced by modern warfare are by common consent now generally known as shell shock. In military medicine 'shell shock' occupies much the same position as did the so-called 'railway spine' of Erichson in the early days of the traumatic neuroses—at first regarded as an organic condition, passing later into the realm of the neuropsychoses, with the element of compensation as a very important factor. A somewhat similar transition may be observed in the attitude towards the condition known as shell shock, in which the idea of commotion or concussion, with slight injury of the central nervous system, has gradually given way to the conception of a pure psychic disorder, from the shock, fear, and horror of modern warfare—the idea of compensation being superadded in the guise of chronic invalidism or a pension. The medical and economic importance of this group of cases can scarcely be over-estimated.

Under the title, "Warfare on the Brain," E. Farquhar Buzzard[1] gives an interesting *résumé* of our present knowledge of shell shock and allied conditions.

J. Michell Clarke[2] reports a number of interesting clinical observations on the neuroses of war. He believes their etiology is varied, and that the majority are due to more than one factor. Some of the causes are psychical—terror, noise, the horrifying sights and experiences of the trenches; others are physical, apart from actual wounds—the concussion of the air due to high explosives, burial in a trench, respiration of noxious gases, especially CO. These neuroses are due partly to the same causes as in civil life, and partly to other and special causes. It is to be expected, therefore, that we should

meet with the familiar neuroses of civil practice, and also with other conditions presenting unfamiliar or special features.

Looking at the cases as a whole, the conclusion seems inevitable that whatever the exact nature of the pathological changes, they must be widely distributed through the nervous system. In accounting for the symptoms, we must not leave out the mental state at one end of the scale, or the failure in muscular nutrition at the other. The disturbance affects the highest cortical levels, the middle levels with the subconscious mechanisms for everyday activities, the motor centres in the cord with their issue in the final common path and the muscles themselves, and often also the afferent paths and the receptive apparatus for localization and the components of deep sensibility. The variation of symptoms in individual cases will depend upon what paths, centre, or centres the incidence chiefly falls.

Though one must be guarded in drawing conclusions from appearance only, the impression generally conveyed is that of a block in the passage of nervous impulses from one neurone to another. Especially is this so in those cases in which the mind seems to have fully recovered, and the muscles of the legs are strong and well nourished, and yet the patient has no power to move them. It looks here as if the resistance of the synapses has been so greatly increased that impulses could no longer pass. It is possible, however, that the difficulty may be due, not to separation in space, but to alteration in the constitution of the terminal ramifications of the axones and of the dendrites.

Babinski and Froment[3] divide the functional neuroses resulting from the traumatism of war into two large groups, those of psychic origin—*pithiatique*—and those of reflex origin—*physiopathique*. In the former group are found the well-known hysterical manifestations of psychological origin, the somatic symptoms of which are susceptible of voluntary imitation. The physiopathies, on the other hand, are reflex and physical in nature, and cannot be simulated by voluntary effort; among these may be mentioned such conditions as the amyotrophies, reflex paralyses, contractures, and trophic and vasomotor disturbances. In the former group the traumatism or perturbation is psychic; in the latter group it is physical, the spinal centres having probably suffered some slight involvement. Symptoms indicating such involvement are muscular atrophy, hypotonia, mechanical hyperexcitability of muscle associated with slowness of the contraction, hyperactivity of tendon reflexes, hyperidrosis, vasomotor phenomena, and trophic symptoms (e.g., retraction of the fascia and tendons, articular tumefactions, and decalcifications of bony tissue), all of which may be regarded as nervous disorders of reflex origin. The authors deny that such symptoms are entirely the result of immobilization, as has been contended by some, and insist that there is an important factor of reflex origin. In treatment, both these possibilities should be considered, and the best results are attained by the combined use of **Psycho-physico-therapeutic Methods.**

The 'Zig-zag' Test and 'Yes and No' Test for Hysterical Anæsthesia.—M. Culpin[4] emphasizes the importance of early recognition of hysterical states in the surgical practice of war. Not only may organic conditions be so closely simulated as to deceive the most wary, but a psychic element is often superadded to a physical disability. In the recognition and differentiation of hysterical states, sensory tests are very important. Such a test is that for hysterical anæsthesia; every man with a weak or paralyzed limb should be tested with a light pin-prick. If there is numbness, or the prick is not felt as a painful sensation, the area of anæsthesia should, if organic lesion be present, follow the anatomical distribution of a nerve or nerves: if the anæsthesia ends at one level, like a sleeve or stocking, it is almost certainly hysterical. To confirm this, the upper limit should be marked with a pen; then the observer starts again at the periphery of the limb, and works upward in a zigzag; this time the limit will probably have shifted downwards for an inch or two, and repeated tests will bring it still lower. Tests with pin, cotton-wool, and pressure, especially if the patient is allowed to watch them, will all show anæsthesia ending at the same level; this never occurs in nerve lesions, and, with the zigzag test, should serve to eliminate those rare cases in which a root lesion of the brachial plexus gives an anæsthesia of the sleeve type.

The principle of the zigzag test should be understood. Localization of a peripheral stimulus is not perfect, and by the zigzag approach the patient is led to feel that a greater distance in a straight line has been covered; hence he thinks the original spot has been reached when the pin is perhaps two inches or more distal to it. If the altered sensation depends upon a genuine lesion, the sense of localization is not called into use, and therefore cannot be deceived; but one must remember that with a true slight alteration of sensibility the answers of a patient may not always be consistent. With a complete loss of sensation in a peripheral nerve, the boundary, if the patient is intelligent, is constant.

If a total loss of sensation is claimed, the 'Yes-No' test is valuable. The patient is made to look at the ceiling and answer quickly, saying, 'Yes' when he feels a touch, and 'No' when he does not. When touched on the anæsthetic area he may say 'No,' thus demonstrating that he really does feel; a smart man will say 'No' once or twice only, or may shape his lips for the word, and then arrest it when he realizes the trap; but one of duller understanding will answer 'No' at repeated examinations without seeing his foolishness.

Hemianæsthesia of the body and limbs is also frequent.

Camptocormia.—Madame Rosanoff-Saloff[5] describes a curious and uncommon condition occurring in certain neurotic subjects as a result of war trauma, mental or physical. It is characterized by a marked spinal curvature in an anterior direction. With this prominent anterior flexion of the trunk there is occasionally seen a lateral inclination. Dr. Sowques, in whose neurological service the cases have

been observed, proposes the term 'camptocormia' for the condition, from κάμπτώ—to bend, and κορμός—the trunk. The attitude of the patient is identical with an anterior flexion of the trunk in a normal individual; there are, however, transverse skin folds on the back of the neck from an effort to hold the head up, and so augment the visual field and facilitate walking. The abdominal muscles can be seen to be strongly contracted underneath the skin. As a rule, most movements of the trunk can be executed with comparative ease, except those of extension or posterior flexion, an effort to perform which often results in a typical generalized tremor of the lower extremities. On the other hand, the majority of the cases can lie flat on their back in bed, and this dorsal decubitis is not even painful. The spinal column is supple, and there is no evidence of local vertebral pain or sensitiveness, except that produced by pressure and palpation of the lumbar musculature on either side. No other abnormality of the nervous system is found, while *x*-ray examination is invariably negative. The cerebrospinal fluid is normal.

Madame Rosanoff-Saloff has examined some sixteen cases of this neurosis, and divides them into two categories—those with actual wounds, and those without. Only two of the series belonged to the first of these groups, and in them the wounds were far removed from the seat of the abnormal flexion. The great majority of the other group occurred in soldiers who had been blown up by a shell, or buried, with a loss of consciousness of variable duration. In all, the earliest symptom was lumbar pain, violent and continuous, and aggravated by movement. From the point of view of pathogenesis, it may be mentioned that the sole position of comparative comfort adopted voluntarily by such patients is that of bending the body forward till the head is between the knees. After some weeks of gradual relief from the pain, they declare that they cannot get their back straight again, and all kinds of local treatment are as a rule unavailing. The persistence of the attitude is explained by the fact that the subjects of the affection are without exception neuropaths.

The prognosis is good provided the patient is removed from the surroundings of the ordinary hospital, where little or nothing is likely to be done to combat the peculiar mentality on which the neurosis is erected. Such patients should be transferred to special neurological centres at the front itself (*dans la zone des armées*), where appropriate medical treatment with rigorous military discipline produces the best results. The suggestion is made to place the patient in a **Plaster Jacket,** with or without an anæsthetic, keeping it in position for eight, ten, or fifteen days. This treatment, coupled with an atmosphere that of itself suggests cure, with proper discipline, is usually successful.

F. W. Mott,[6] in the Chadwick Lecture, reviews our present knowledge of shell shock, and the general methods of treatment as used at the Maudsley Hospital.

The **Continuous Warm Bath,** at the temperature of the blood, is of

great value. The patients are kept in the bath for a quarter to three-quarters of an hour, or even longer, and the effect is most soothing to the nervous symptoms. These baths are extremely useful in cases of maniacal excitement. Often the bath, with a drink of warm milk at bedtime, suffices to produce sleep without hypnotics. But if hypnotics have to be given, the quantity required is less when combined with the baths. The next thing is to attend to the general bodily condition by giving nourishing, digestible, and easily assimilated food; and, lastly, very important is attention to the *primæ viæ*, by which auto-intoxication and cerebral congestion can be relieved. The severe headache from which these patients suffer requires relief by an **Ice-bag** to the head, **Aspirin, Phenacetin,** and drugs which relieve neuralgic pains. After the patient has recovered from the more serious condition of shock, and the mind is becoming more alert and interested in its surroundings, it is wise to consider how best to allay the symptoms from which nearly all suffer —headaches, dizziness, tremors, feeble circulation, and exhaustion, readily brought on by mental or bodily effort. If the patient is sufficiently well to sit up, it is better that he should do so, at first for a few hours a day, if possible in the open air. Quiet repose in single rooms is undoubtedly a most important and necessary mode of treatment in the early stages of severe cases. At the same time these patients should not be left alone; quiet and unstimulating diversion of the mind should be encouraged, to avoid introspection and dwelling upon the terrible experiences they have gone through. These men are often too tired to read, or unable to do so for want of concentration of attention, and may be amused by simple games, knitting or wool-work, bead-work, basket-work, and net-making.

Mental Hygiene in Later Stages.—As soon as they are better, patients are encouraged to play billiards, cards, and other games, in the winter time especially; also there are frequent concerts and popular lectures, all of which serve to divert the mind and produce an atmosphere of cure which is very essential. Soldiers will put up with a good deal provided they have good and abundant food, and it is essential for recovery that there should be no grumbling. Grumbling is contagious, and it is always well to get rid of a soldier from a ward if he is exciting discontent in the others. Discipline is very essential.

Again, in many of these functional paralyses, the idea of a permanent disability, requiring pension for the rest of a man's life, may become fixed, owing to wrong diagnosis, over-sympathy, and misdirected treatment. In many cases, all that is required is a strong suggestion to the patient that there is nothing the matter with him except the idea that he is paralyzed; this has become firmly fixed in his mind by prolonged rest in bed, daily massage, and electricity, continually suggesting to him that there is an organic disease causing his complaint.

In all functional paralytic conditions of an hysterical nature a

great tonic is to tell the patient that it is not at all likely he will ever be sent back to active service, for he would be of no use, and that what we want to do is to discharge him from the service in such a state that he will be fit to resume his previous occupation, or we can put him to some work useful to the State, whereby he will not be a burden to himself or the community. If this method were adopted early, in a large majority of cases known by an expert to be temperamentally unfit for military service, a great economic saving would be effected.

Special stress is laid upon the value of **Associated Movements**, such as we get with the parallel bars, the climbing rope, skipping, football, Indian clubs, the nautical wheel, and the ordinary apparatus of the old-fashioned gymnasium. Diversion of the mind by useful occupation, both in the workshop and in the garden, has been most successful in restoring health and strength to these disabled men.

Agricultural Employment During and After the War.—Occupation in the open air is a very beneficial mode of treatment of nervous cases in the convalescent stage. It does not, however, always seem to be popular with a certain type of case. In commencing the treatment of convalescents by manual labour, it is essential to regulate carefully the character of the labour and the number of hours per day; and the work should be so arranged and graduated as not to induce more than that gentle sense of fatigue that promotes appetite, interest, sleep, and the general sense of well-being.

Wilfred Garton[7] recommends the use of **Cerebrospinal Galvanism** in milder forms of shell shock (p. 60).

A pad composed of about sixteen layers of lint, soaked in a solution of **Sodium Salicylate** in distilled water, is applied to the forehead, care being taken that the pad is evenly wetted, the centre coinciding with the middle-line of the forehead. Over the centre of the pad is placed a metal plate, and the whole is firmly bandaged to the head. The metal plate is connected to the negative pole. A pad of the same thickness, about 10 in. by 6 in., is soaked in tap-water, covered with a metal plate, and firmly bandaged to the lumbar region. This is connected to the positive pole. The current is increased very slowly, taking about twenty minutes to attain the maximum of 20 ma., at which point it is allowed to remain for twenty minutes, and then is slowly reduced to zero. When increasing the current the cell collector is advanced before reducing the resistance, and when decreasing the current the resistance is used first.

J. B. Tombleson[8] reports sixty cases treated by **Hypnotic Suggestion**, and advocates the use of this method in the various psychasthenic and neurasthenic complications of war.

Adrian and Yealland[9] discuss the treatment of some common war neuroses, and describe a method which was found to be extremely useful. It was applied in 250 cases, which included all the more common types of hysterical disorder—mutism, deafness, aphonia, monoplegia of the arm or leg, paraplegia, hemiplegia, and disordered

gait not associated with organic change. The majority of the cases have been of several months' standing, but in spite of this the treatment has been almost immediately successful in at least 95 per cent of the cases in which it has been applied. It consists in a very brief **Suggestion** treatment, followed by rapid **Re-education,** which is continued, if possible, without a pause until the normal function is entirely regained.

F. Kaufman[10] has formulated a system of *disciplinary treatment of shell shock*, for which he claims excellent results. It is a combination of suggestion and painful electrical shocks, the aim of which is to effect a drastic cure, if possible, in one sitting. The four principal features are as follows :—

1. Preliminary suggestion, consisting not only of stock methods of suggestion, but also the 'atmosphere' of a hospital in which successful cures are numerous. It was impressed on the patient that, though treatment would be painful, cure would be complete and permanent.

2. Powerful electrical shocks, supplemented by vigorous 'word-suggestion.' As a rule, the sinusoidal current of a pantostat was preferred to the faradic current. It was combined with the galvanic current when there were symptoms of hysterical anæsthesia. Some idea of the patient's sensations may be gathered from the term *Ueberrumpelung* (unexpected attack) used in the author's description.

3. Maintenance of an atmosphere of strict military discipline. From the moment the patient was admitted, he was impressed with the spirit of unquestioning, unreasoning obedience.

4. Masterfulness and pertinacity were essential; it might take hours before the desired effect was obtained, but with perseverance and the exertion of the physician's whole personality, success was ultimately achieved.

This system, he admits, is unsuited to ambulatory cases, and in slight early cases might be superfluous. It was contra-indicated in patients recently exposed to prolonged mental strain, and in acute neurasthenics. The system called for less specialized training in the physician than hypnosis. Again, patients might defy the influence of hypnosis, whereas the *Ueberrumpelung* system left them no choice. After the ordeal the patient should be kept in hospital a few weeks to diminish the chances of a relapse. He should not be sent back to active service, and it was even doubtful whether he would be fit for garrison duty.

Neurasthenia in Soldiers.

Burton-Fanning,[11] in his report to the Medical Research Committee, emphasizes the great prevalence of neurasthenia in soldiers, and its more important characteristics as met with in military life. His general survey and conclusions should be of decided value to all who have to do with problems of diagnosis and treatment.

Symptoms.—The neurasthenic individual never confines his account to what might be explained by any one organic disease or by the

affection of any one organ. The widespread distribution of his symptoms is the first point in diagnosis. If he makes rheumatic-like pains his chief complaint, he will go on to describe sensations in the head and the heart, and show the general manifestations of the neurotic state.

As a rule these patients start soldiering with the conviction that their strength will not enable them to stand it. They are suddenly thrust into an uncongenial atmosphere, they dislike the work, and find their comrades unsympathetic. Weakness, prostration, a feeling of exhaustion, or sudden collapse, are invariable; while want of energy, and inability to interest or concentrate themselves, are frequent causes of 'going sick' amongst those engaged in office work. Other symptoms which are common to all neurasthenics, whatever may be their chief complaint, include tremors. These may be shown by the slightest quivering or over-action of the upper lip in speaking, by the rapid vibratory movement of the upper lids when the eyes are closed, or by fine tremors of the extended fingers. These phenomena are of importance, because they put the examiner on the nervous track at sight. Violent tremblings and rhythmical contractions of the limbs or whole body are not infrequently seen, and in many of the cases have been labelled malarial rigors. Apart from symptoms referable to the heart, there is a fairly constant group of vasomotor phenomena—cold extremities, hot and cold flushes, giddiness or faintness. Sweating is a remarkably active function with neurasthenics. Moist palms or soles, or steaming body often suggest the diagnosis, and it may amount to literal drenching of the whole body in circumstances of extra mental stress. In more than half of the tested patients the fields of vision were normal, and in those whose fields were contracted, the other manifestations of the neurotic state were usually so marked that the test was only of use as confirmation.

Very few of the men were anæsthetic, and the areas affected in them were variable—by no means always assuming the glove-and-stocking distribution. The occurrence of any anæsthesia, again, seemed to be confined to the more marked cases, and did not help in the detection of masked neurasthenia. Their pre-occupation of mind makes these people unreliable witnesses for delicate changes of sensation. Moreover, they are very susceptible to suggestion.

In their order of frequency, their chief complaints, or the diagnosis with which they arrived in hospital, can be considered under the following headings :—

Rheumatism. This is the most common averred cause of disability. Pains in the legs, in the back, and less markedly in the arms, are stated to be constant, but to be aggravated by marching.

These pains may have been called *neuritis*, but there is a complete absence of other symptoms or of signs of nerve inflammation. If such pain happens, for example, to be referred to the region of the sciatic nerve, this can be stretched without characteristically increasing the pain, and no wasting will be discovered. Most neurasthenics

have some symptoms referable to the heart, and in these people the supposed affection of the heart is sometimes connected with an alleged rheumatic fever. In a large number of cases labelled 'disorderly action of the heart,' rheumatic fever is stated to have occurred in the past. In the writer's opinion, however, closer scrutiny substantiates the neurotic rather than the rheumatic element.

Gastritis is the term particularly affected by these patients, and apparently by their doctors, when the stomach is the seat of chief complaint. These are brought on by food—especially by army rations—and also by marching or by any upset. Flatulence and pyrosis may be complained of, and the tongue is furred.

The heart is the seat of some sensations in all neurasthenics, whatever may be the main complaint. Pain is often complained of, and is usually well below the heart, quite away from the common seat of anginal pain. Palpitation, dyspnœa, giddiness, or actual faintings, together with the neurasthenic's general symptoms already described, are almost constantly present in neurasthenics. These are the symptoms comprised by the condition termed 'D.A.H.' or 'soldier's heart' which have been studied and described by the observers at the Hampstead Military Hospital.

Lung disease. A considerable number of men came labelled 'tuberculosis.' Apparently the complaint of pain in the chest, of some difficulty of breathing, or of a streak or two of blood in the phlegm, are thought sufficient grounds for mentioning this disease. Then the loss of a little weight and of strength, and the tendency to sweat, which are characteristic of neurasthenia, become fastened on as corroborative evidence.

The bladder is frequently thought to be affected. Micturition is said to be frequent, or difficult, or unrestrained. Backache is often associated with these symptoms.

The throat is very commonly the seat of a variety of distressing symptoms in neurasthenia; but among soldiers, functional aphonia has been the only phenomenon met with as the prominent complaint associated with the throat.

The sexual organs, again, have been much less frequently involved in the soldier's neurasthenia than in that of the civilian.

Treatment and Prevention.—A great deal of neurasthenia must be laid at the door of the doctor who fails to make a strictly correct diagnosis, and who does not disabuse the patient's mind of his apprehensions about the presence of organic disease.

A large number of patients had followed sedentary occupations up to the time of joining, and even those who conscientiously wish to serve their country are overtaxed by being called to do strenuous exercises without any training. There would be fewer breakdowns among recruits if they could be better classified and gradually got on to full drill.

Treatment seems to resolve itself into an attempt to remove from the mind whatever is the disturbing influence. The doctor's first

task, therefore, is to gain the patient's confidence, and discover the nature of his troubles. A careful physical examination should always be made, and in the large class where fear of some dreadful disease has been preying upon the mind, reassurance on this point may be all that is required to give them a good start on the road to recovery.

What proportion of these men can be made into soldiers? Not a few of the confirmed cases were made to see the error of their ways, and returned to their units determined to do their bit; but in the majority it is doubtful if real fighters will ever be made of them.

Disorders of Speech accompanying Shell Shock.

An admirable discussion of these disorders has been given by Charles S. Myers.[12] The principal disturbances of speech may be grouped under three heads, viz., aphonia, dysarthria, and mutism. Dumbness is by far the commonest disorder of speech, occurring in about 10 per cent of cases of shock which were observed; an affection of the articulation, e.g., stuttering, or jerky speech, was encountered in only about 3 per cent; while loss of voice as the result of shock was of somewhat rarer occurrence.

Mutism.—The immediate causes of mutism may be conveniently grouped as (*a*) *Physical*, the patient having been lifted, buried, or knocked over by a shell, or having otherwise felt the effects (physical or chemical) of its explosion; and (*b*) *Psychical*, where, for example, the noise of the shelling has terrified him or a shell has burst near to him, horribly mutilating several of his comrades.

Predisposing Condition.—In about one-third of the cases of mutism, various predisposing affections may be demonstrated, e.g. 'nervousness,' 'fits,' stuttering, wounds, or exposure to the enemy's gas. It is not restricted to any one age, and may occur in men of thirty, forty, or even fifty years. The average age is about twenty-five. It is extremely rare among commissioned officers.

Immediate Effects.—The usual direct result of the shock is 'loss of consciousness' or 'loss of memory.' Unconsciousness appears to be commoner in group (*a*), and amnesia in group (*b*). The amnesia complained of is almost always due to the onset of a semi-stuporose state, and most cases of initial loss of consciousness are really the expression of a condition of confusion or stupor.

Onset.—Most of the patients claim to have found themselves mute on 'coming to.' That is to say, their functional condition is of 'unconscious origin'; whereas in the cases of mutism in which no loss of memory occurs, it is probably often of 'conscious origin.'

Cases of mutism at the field ambulances and clearing stations—that is, within a very short time after the occurrence of the shock—differ usually from those at the base hospitals (1) in being more completely mute, (2) in being more intensely pre-occupied and more intolerant of suggestion.

Degrees of Mutism.—Many of the men, seen soon after the onset,

were absolutely dumb. Most of those observed at a later period, however, could be speedily induced to whisper consonantal sounds, and sometimes vowels; while a few had so far progressed as to be able, with encouragement, to repeat in a whisper single monosyllabic words, or even to reply (almost always monosyllabically) to questions. With few exceptions mutes could be induced to cough. Whistling or forcible expiration was often impossible.

Deafness.—A considerable number of mutes give a history of initial deafness. Deafness is as common in the (*a*) as in the (*b*) group. In many cases it is clearly due to inattention, being part of the vacant, semi-stuporose, or preoccupied condition of the patient. These cases usually recover their hearing before their speech.

Other Concomitants of Mutism.—Stupor (with the defects which may be considered as part of this condition), amnesia, and deafness, are by far the commonest concomitants of mutism. Besides these, the following affections may be mentioned in their order of frequency: muscular tremor, contracted visual fields, unsteady or inco-ordinated movements, defective cutaneous sensibility. No case of functional hemiplegia or of hyperæsthesia associated with mutism was observed. In a few of the severe cases fugues or hysterical fits occur at the outset; in other severe cases voluntary movement is slow, and handwriting is accomplished with difficulty; but, as a rule, writing is easy and the mute patient is eager to describe on paper his experiences—as far as he can recollect them—ending typically with the expression of a wish that he may soon regain his speech.

Experiences of Mutes when Trying to Speak.—In fully 25 per cent of the cases reference is made by the patient to discomfort or pain in the throat, the complaint being that with each attempt "something grips me at the sides of the neck," that "my throat is sore," "tickles," or "pains"; a few refer to inability to move the tongue freely (although they can nearly always protrude it), "something holding my tongue at the back," "my tongue seems to stick," "it curls up at the tip," etc. Now and again this had occurred during the mental strain just preceding the final breakdown. Some patients make the most violent grimaces on attempting to imitate the sounds of consonants. Not infrequently they complain of headache, "drumming in the head," or "dizziness," when they try to talk.

Recovery from Mutism.—In over 75 per cent of the mute patients improvement was rapid, the (*b*) cases recovering much more rapidly than the (*a*) cases. The majority were cured by simple encouragement, persuasion, and **Suggestion,** aided or unaided by **Hypnosis**; some were cured by an **Anæsthetic**; a few recovered their speech spontaneously; and a few after being harshly reprimanded and isolated from other patients.

When speech returns after mutism, it is often laboured or hesitating, more rarely whispered or stuttering, but these defects almost always disappear rapidly. Sometimes the voice is temporarily altered in character, one patient, for example, not recognizing it as his own

for a few days. Where simple suggestion and encouragement are only imperfectly successful, a complete cure may often be made by recourse to hypnosis.

Conditions determining Recovery from Mutism.—The youngest patients appeared to regain their speech rather less rapidly than the oldest. The (*b*) cases recovered more readily than the (*a*) cases, the predisposed rather more readily than those not predisposed, the stuporose cases more readily than those in which stupor had not been observed, in certain of which some degree of malingering doubtless played a part.

The methods of treating mutism may be broadly described as 'psycho-therapeutic.' For a successful issue they should be employed neither too soon nor too late after the onset of the condition. The obstinate cases of which one receives accounts from England are no doubt partly due to the ineffectiveness or lack of earlier treatment, which has thus allowed the process of inhibition at work to become systematized into a habit difficult to cure.

After-history of Mute Cases.—Of 12 cases with some after-history, only 1 appeared to be doing well with his regiment at the front; 2 others, returned apparently fit for duty, reported sick repeatedly with trivial ailments, until at length they succeeded in coming into hospital again. Of the 9 who were transferred to hospital in England, 2 were readmitted to hospital after previous discharge to duty: 3 were still unfit for duty after four months; 2, though on light duty after three months, and 2, though on duty after seven months' treatment, had not completely recovered from the shock.

Causation of Mutism.—The (*a*) and the (*b*) cases present precisely the same features of mutism, just as, when dealing with disorders of cutaneous sensibility, it was found they presented similar features of hyperæsthesia and anæsthesia. As would be expected, mutism in the (*a*) cases (where the shock must have been grosser and more profound) generally proves more severe than in the (*b*) cases, and, as we have just seen, the less resistant subjects—e.g., the predisposed patients—are more prone to mutism and more readily recover from it. We may conclude, then, that whether mutism occurs as the *apparent* result of physical, chemical, or mental causes—i.e., as an (*a*) or a (*b*) case—it is *actually* always the result of mental—i.e., psycho-physiological—shock. With few exceptions, mutism is a functional disorder of 'unconscious origin,' whereas aphonia is commonly, and dysarthria occasionally, a functional disorder of 'conscious origin.'

Dysarthria.—The cases of dysarthria with which the writer met, range from a slight stutter, stammer, or jerkiness of speech, to almost complete anarthria, according to the degree of disturbance in the correct working of the articulatory mechanism. These cases are almost invariably associated with other motor inco-ordination of a functional character.

Aphonia.—Cases of primary aphonia from mental shock, of

'unconscious origin,' as contrasted with functional aphonia due to suggestion, conscious or unconscious, are, in his experience, rare. In this and in other respects aphonia is distinguishable from mutism; they are not to be considered as differing from one another merely in degree. Malingering plays a far more important factor in this variety of speech than in any other.

General Conclusions.—The views here expressed as to what mutism is and is not due to, are also applicable to dysarthria and aphonia.

Such disorders are not immediately attributable to violence, gas poisoning, or other physical causes. They are the result of a functional inhibition, which is usually traceable to intense fear or horror, but which may occasionally arise in circumstances where consciousness has been so instantaneously lost that the emotional effects of the shock have not been actually explained by the patient.

In the disorders of speech two similar kinds of inhibition are discernible: the one due to a blocking of the paths that subserve the mechanism of articulation or phonation, the block producing the quasi-paralysis of functional mutism or aphonia; the other due to a blocking of other paths that control and co-ordinate those mechanisms, the block producing the quasi-spastic, -clonic, or -ataxic conditions of functional dysarthria.

In some cases of mutism the block yields a condition to some extent comparable to a so-called 'kinæsthetic apraxia.' The patient appears to lack all notion of how to talk, to whistle, or to cough. Instead, he makes extraordinary grimaces, his mouth often continuing to work long after he is actually endeavouring to imitate a given word. It may be called a state of functional motor aphasia, and it is due, like that of organic motor aphasia, to an inability to translate normally-produced internal language into the corresponding movement. In both forms the patient may read and write intelligently, but the functional form may differ from the organic in that in the former speech may be completely absent, whereas in the latter the patient is occasionally able to utter a few words normally articulated.

In other cases of mutism the inhibition is of a higher order, and it results in a state comparable to an 'ideational apraxia,' in which the subject can perform simple articulatory movements, but is powerless to combine them into the movement complexes of speech.

In other cases, again, the inhibition produces a state resembling 'verbal agnosia,' in which the patient has forgotten the meaning of words heard or read. Such cases have not been included in this communication, as they may be more conveniently considered under the head of amnesia.

The areas inhibited may spread still wider or higher, producing partial or complete amusia, alexia, or agraphia, or narrowing the field of consciousness to a condition of general amnesia, in which the patient has lost all memory of the past, or to one of stupor, in which he has lost all power of response to his environment.

Such disturbances of speech, such inhibitions, are not, as has been urged, maintained by fear, nor need they be evoked by fear. They may be evoked by various other emotions—horror, grief, disappointment, or anxiety,—or they may be due merely to the obscure neuropathological concomitants of shock when no emotion, as such, has had the opportunity of being experienced ; and they are maintained by the persistence, not of the emotion as such, but of the pathological disorder of inhibition thus arising.

References.—[1]*Lancet*, 1916, 1095; [2]*Clin. Jour.* 1916, 395; [3]*Presse Méd.* 1917, 385 ; [4]*Brit. Med. Jour.* 1916, 548 ; [5]*Lancet*, 1917, 269 ; [6]*Brit. Med. Jour.* 1917, 39 ; [7]*Ibid.* 1916, 584 ; [8]*Lancet*, 1916, 707 ; [9]*Ibid.* 1917, 867 : [10]*Brit. Med. Jour.* 1916, 882 ; [11]*Lancet*, 1917, 907 ; [12]*Lancet*, 1916, 461.

SINUSES, NASAL ACCESSORY. (*See* Nasal Accessory Sinuses.)

SKIN DISEASES, ULTRA-VIOLET RAYS IN.

E. Graham Little, M.D., F.R.C.P.

Wise[1] speaks favourably of his experience with this agency after two and a half years' trial, and notes an important advantage as compared with *x*-ray treatment, that it is much more difficult to do harm with ultra-violet than with *x* rays. In fact, a fairly severe reaction is necessary to produce results, and failure is usually to be explained by timidty in pushing the exposure. Wise has had successes in treating, by this method, parapsoriasis (a notoriously intractable affection), angioma serpiginosum, chloasma, acanthosis nigricans, rosacea and seborrhœa, acne, and, most conspicuously, furuncle, in which this method gives speedy and satisfactory relief of the pain and tension ; in sycosis it is especially valuable. The method, oddly enough, failed completely in three cases of alopecia areata, in which the earliest triumphs were won. Psoriasis was also disappointing, and eczema behaved very variably, relief being afforded in several cases but without preventing recurrences. In premature loss of hair the method is highly praised, and it is claimed that three irradiations at intervals of a fortnight usually arrest loss from this cause.

Reference.—[1]*N. Y. Med. Jour.* 1917, i, 196.

SKIN DISEASES IN WAR. (*See also* Scabies.)

E. Graham Little, M.D., F.R.C.P.

MacCormac[1] has a timely and admirable paper on this important subject. He points out the importance of dermatological experience in diagnosing infective diseases early and in stopping their spread. Familiar diseases acquire certain special and misleading characterstics in war conditions.

Scabies.—This condition, the most widespread in its incidence and that of the diseases it leads to, differs somewhat from the civil disease. Itching may be even negligible by the hardened soldier. The burrow is not always seen, and more stress is to be laid on the interdigital vesicles, and especially the lesions on the penis and the

secondary impetigo of the buttock, features which are pathognomonic. Boils are so frequently the result of scabies that their presence should suggest the diagnosis of itch. The source of infection is probably clothing, and especially blankets, rather than personal contact. A frequent source of infection is the partially treated scabietic, who is pronounced cured before he is actually free of infectivity. The suggestion has been made that the peculiarly severe symptoms of scabies noted under war conditions indicate a new form of sarcoptes, but specimens sent for examination to a noted entomologist were pronounced to be of the human variety. The treatment, to be successful, requires opening of the burrows, application of an efficient parasiticide, and disinfection of the clothing. A hot bath, with rubbing of the whole body with soap and water, the application of **Sulphur Ointment** twice daily for three successive days, and the treating of the clothing with superheated steam or sulphur vapour, are adequate measures. It should be remembered by the medical officer that lesions on the skin may remain after the disease is cured, and the tendency is to over-treat, especially in prolonging applications of ointment. The impetigo complicating scabies is of ecthymatous type, and is of streptococcal causation. Sulphur treatment need not be delayed on this account, and the condition is, on the contrary, benefited by the sulphur treatment applied for scabies.

Ecthyma assumes formidable importance as a war disease. The legs and thighs are the parts most often involved, and the distribution may be very wide. The elementary lesion is an ulcer covered by a thick black crust; pus can usually be pressed out from the deeply undermined edges. The *Streptococcus fæcalis* is the organism usually met with in the ulcer. The inference is that contact with fæcal matter is the source of contagion. Treatment should be commenced with fomentation of the part for a few days, and then dressings of **Perchloride of Mercury** applied as long as the skin will stand them. Painting of the ulcer with 3 per cent **Spirit of Nitre Solution of Silver Nitrate** is specially recommended by the author.

Linear Impetigo.—Under this title the author describes a form of impetiginization, which is probably a combination of artefact lesions and impetiginization. Long linear ulcerations running down the long axis of the leg mark this type, which is of frequent occurrence.

Seborrhœa.—This disease also assumes great importance in army work, principally because of the secondary infections which are often grafted upon it, by far the most frequent being the streptococcus. Most serious of these is a diphtheroid organism, which there was some evidence for thinking might be true diphtheria. The most usual sites for seborrhœa were the scalp, eyebrows, beard, moustache, and flexures of the limbs. The relapses of seborrhœal diseases were so constant that the author regards men suffering from this disorder as fit for employment in only some special capacities. Strong antiseptics, the use of which is tempting in view of the bacterial contaminations, are really mischievous, and **Calamine** lini-

ment is the best application in early stages. The hairy parts should be shaved, and lint soaked in the liniment applied to the affected areas. When the ear is involved, all the crevices of the part are to be packed with the soaked lint, and the whole covered with cotton-wool and bandaged. Seborrhœa on the body may be successfully treated with weak **Sulphur** ointments and **Perchloride** lotions. General tonic treatment is always to be given in addition.

Semon and Barber[2] corroborate MacCormac in his remarks on the importance of scabies and the impetiginization which follows. They recommend especially the following ointment for the ecthyma which is so troublesome a complication of scabies and pediculosis corporis:—

R	Acid Salicyl.	Ung. Hydrarg. Ox. Flav.	ad ℥j
	Sulph. Præcip.	āā gr. x	

They further point out that the pediculus corporis frequently lays its eggs in the hair of the pubes and axilla, and urge the importance of disinfecting the patient as well as his clothing.

References.—[1]*Brit. Jour. Derm.* xxix, 141; [2]*Ibid.* 173.

SKIN, SARCOMA OF. *E. Graham Little, M.D., F.R.C.P.*

Joseph and Erwin Zeisler[1] report two cases of a very rare form of non-pigmented primary sarcoma, occurring as a single nodule in the thickness of the skin, in a young man and young woman respectively. In one case it was in the site of an injury. There were no glandular enlargements in connection with the growths in either case, and the diagnosis was only made with certainty when sections were examined. Giant cells and spindle cells were found in the first case, spindle cells alone in the second.

The authors quote Johnson's description of the clinical characteristics of spindle-celled fibrosarcoma as follows: (1) Slight malignancy; (2) Absence of metastases in skin nodes and viscera; (3) Extremely slow spread; (4) Tendency to progression in one spot with spontaneous involution in others; (5) Absence of pigment; (6) Superficial character of ulceration if any is present. It remains, however, true that certainty of diagnosis rests on the histological examination, without which it would be imprudent to form a definite opinion of the nature of the growth. The treatment adopted in each case, and with complete success, was to excise the nodule freely, with the additional precaution, in the first case, of applying **Radium** to the site of the operation. (*See also* Radium Therapy, p. 56.)

Reference.—[1]*Jour. Amer. Med. Assoc.* 1914, ii, 111.

SKULL, GUNSHOT WOUNDS OF. *J. Ramsay Hunt, M.D.*

J. Abadie[1] presents some interesting statistics of operations on the skull performed twelve kilometres from the Front on patients whose condition rendered immediate operation desirable.

From March 1, 1915, to January 1, 1916, among 2671 wounded, operations were performed on 127 for penetrating wounds of the skull. Of this number, 56 died and 71 recovered. There were 47

penetrating wounds without injury to the dura mater, with 39 recoveries and 8 deaths. There were 80 cases in which the dura mater had been torn or injured by projectiles or splinters of bone, with 32 recoveries and 48 deaths.

The more recent statistics covering a period from January 1, 1916, to May 30, 1916, showed, among 1146 wounded, 45 penetrating wounds of the skull. In 23 of these the dura was uninjured; recoveries 17, deaths 6. There were 22 with lesions of the dura, with 13 recoveries and 9 deaths. The author calls attention to the fact that the proportion of skull injuries is lower in the statistics of 1916 (3·9 per cent) than in those of 1915 (5 per cent), a diminution which he attributes to the introduction of the steel helmet, the importance of which is not yet sufficiently recognized by the officers and men, who frequently neglect its use in warfare. Injuries of the dura mater were also less frequent in the 1916 series, which is another proof of the efficiency of the protection 'casque.'

The author believes that all scalp wounds should be incised and explored unless their superficial character is assured. Furthermore, that all wounds of the skull, even those which are superficial, should be subjected to surgical exploration. All other cases should be trephined, or the injury to the bone enlarged, and fragments removed or elevated. The general condition of the patient should not be regarded as a contra-indication to surgical intervention.

Kellogg Speed[2] tabulates as follows his experience in 75 cases of gunshot fracture of the skull :—

Table I.—Indicating the Bone involved by the Wound of Entrance, and the Degree of Injury to the Subjacent Structures.

Parts involved	Patients			Results	
	Number	Operated on	Not Operated on	Recovery	Deaths
Bone involved (by wound of entrance) :—					
Frontal	22	11	—	14	8
Parietal	17	11	—	14	3
Temporal	19	11	—	15	4
Occipital	17	6	—	13	4
Cranial structures involved by the missile :—					
Cranium alone ..	31	12	19	28	3
Dura opened ..	9	8	1	5	4
Cortex exposed ..	4	4	0	1	3
Cortex punctured	29	16	13	20	9

Two of the patients developed symptoms of insanity, and although

decompression was performed, no improvement ensued. Two cases developed epilepsy, one recovering after operation.

Table II.—Indicating the Complications and Results in Operative and Non-operative Cases.

Treatment and Complications	Number	Recoveries	Deaths
Patients operated on	39	21	18
Paralyses improved ..	8	—	—
Paralyses permanent ..	4	—	—
Hernia cerebri improved ..	7	—	—
Hernia cerebri permanent	10	—	—
Terminal meningitis ..	12	—	—
Brain abscess	1	—	—
Patients not operated on.. ..	36	33	3
Paralyses improved ..	4	—	—
Paralyses permanent ..	3	—	—
Terminal meningitis ..	1	—	—

H. Burckhardt,[3] writing on the treatment of infected wounds of the skull, discusses the origin of the meningitis which was the almost constant cause of death. In some cases there appeared to be a definite progress towards recovery; but suddenly, after some weeks, headache commenced, the mind became affected, the temperature rose, and death followed, with or without the usual symptoms of meningitis. In these cases a hernia had usually formed, and had granulated over. He concluded that the meningitis was always caused through infection of the ventricle in these more prolonged cases. When death occurred within the first week from the injury, the adhesions were not sufficient to exclude the possibility of a direct infection from the wound.

Conditions leading to infection of the ventricle were: (1) Direct injury of the ventricle by the projectile, by the lacerations of the brain caused by the sudden increase of pressure and extending to the ventricle itself, or by fragments of bone; (2) A progressive encephalitis, gradually approaching the ventricle; (3) The detachment of necrotic masses in the wall of the brain wound. Infection followed primary wound of the ventricle a day or two after the injury in some cases; in others a ventricular fistula formed, and if the outflow of fluid were free, infection might be long delayed. In almost every case of primary wound of the ventricle, infection occurred sooner or later

According to Leriche,[4] *lumbar puncture* is of doubtful diagnostic value as an indication for operation in cases of fracture of the skull, as the fluid is very often clear. The tension of the fluid likewise he finds of doubtful diagnostic value. On the other hand, repeated **Lumbar Puncture** has a definite therapeutic value in nearly all cases of cranial injury.

Repair of Cranial Defects.

For the reparation of cranial defects many forms of operation have been suggested, which may be classified somewhat as follows:—

Periosteal, osteoperiosteal, and cutaneo-osteoperiosteal cranioplasty.—These operations involve the removal of part of the outer table of the skull adjoining the breach. This is a matter of some difficulty, causes considerable shock, and necessitates the use of an expensive apparatus such as an Albee's bone-set.

Bone-grafts.—These may be autoplastic, making use of the ribs (Kahle), great trochanter (Mauclaire), scapula (Leclerc), or tibia (Delagenière): these are all operations of some magnitude, and involve a considerable waiting period. The use of homoplastic grafts is limited by the difficulty of finding a suitable subject to take them from. Heterogenous grafts may be used—for example, the bone of a dog (Macewen, Ricard)—but these are open to the same objection as all heterogenous work.

Cartilaginous grafts may also be used, as well as *sterilized decalcified bone.*

Prosthetic methods, such as the use of plates of gold (Estor) or ivory (Mauclaire) may give excellent results. They are, however, open to the objection urged against the introduction into the tissues of any non-absorbable foreign substance—that it may, and often does, come to act as an irritant. This does not matter much in the case of a bone-plate which can be removed when its work is done: it is, however, a serious thing when the removal of the foreign substance would undo all the work of the operation.

Cranioplasty by means of Cartilaginous Grafts.—This is recommended by Warren Woodroffe[5] as the best and most universally applicable of all. It is at once safe and simple, the shock is minimal, and the grafts are autoplastic

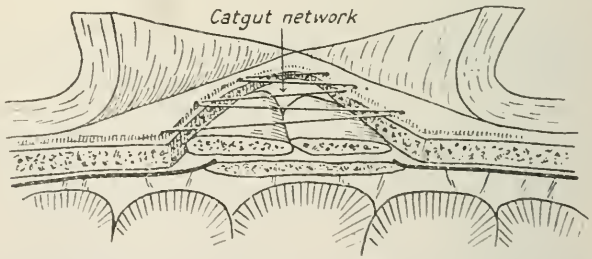


Fig 108.—Diagram showing cartilaginous grafts inserted between a trellis of fine catgut and the dura mater. (*By kind permission of the 'British Journal of Surgery.'*)

The operation was first described by Morestin in February, 1916, and consists in the filling of the gap with grafts taken from the lower costal cartilages. The following advantages may be noted: the grafts are autogenous; the shock to the patient is very small, the

PLATE XLVIII.

CRANIOPLASTY WITH CARTILAGINOUS GRAFTS

Before operation.

After operation.

Plates XLVIII to LIV by kind permission of 'The British Journal of Surgery.'

PLATE XLIX.

BONE TRANSPLANTATION IN SKULL INJURIES

Fig. A.

Fig. B.

Fig. A shows a gap in left temporoparietal region, $4\frac{3}{4} \times 3\frac{1}{2}$ in., after first operation (74 days). *Fig. B* shows the same case 152 days after the second operation, when the upper graft was 280 days old.

suffering entailed is not great, and the risk in suitable cases is practically nil ; the object is rapidly attained : most patients leave hospital with a solid skull at the end of a month or five weeks. There is no need to wait, as in the case of bone-grafts, for several months after the wound has healed before proceeding to operation ; the cartilage appears to possess a power, unknown to bone-grafts, of resisting infection ; in frontal cases it gives an opportunity for moulding, and readily allows of cosmetic results only obtained with difficulty by other methods. *Fig.* 108 illustrates the method of inserting the graft, and in *Plate XLVIII* are photographs of a patient before and after operation.

The repair of cranial defects is also the subject of an interesting report by a French surgeon, Villandre.[6] He has personally operated on 106 cases without a death, and has employed the following methods : the autoplastic bone-graft ; the autoplastic cartilaginous graft ; sterilized bone-plaques ; and calcium paste. The latter substance is a paste containing the **Carbonate and Phosphate of Lime,** and was used for closing in the smaller defects.

The post-operative success of these various methods is tabulated as follows :—

Method	Cases	Results
Autoplastic bone-graft ..	32	All successful
Autoplastic cartilage-graft	48	46 ,,
Sterilized bone-plaques	22	All ,,
Calcium paste	4	2 ,,

He concludes that the living graft, either bone or cartilage, taken directly from the tibia or costal cartilage of the patient, yields the best results.

The utilization of sterilized cranial bones in the repair of cranial defects has been advocated by Sicard and Dambrin.[7] The technique is as follows : the cranial bone is removed as soon as possible at autopsy, and is boiled for two or three hours. Careful measurements of the defect to be repaired are then made, and a corresponding piece of bone is removed, properly bevelled, and fenestrated around the edge. This plaque is placed in ether for twenty-four hours, afterwards in equal parts of ether, alcohol, and formalin for a day. It is then sterilized in an autoclave at a temperature of 120°. Higher degrees of heat, 130° to 140°, are to be avoided, as the bone tends to undergo softening. After sterilization it is placed in bouillon, and if the medium remains sterile the plaque is suitable for surgical use. In carrying out this prosthetic method the plaque is placed over the defect like a watch-glass, and is fixed by catgut suture passing through the fenestra to the adjacent soft parts. It is then covered as far as possible by periosteum, which is turned back from the healthy bone.

The writers advocate a preliminary repair of the scar by covering

it with healthy scalp tissue. Great care should be exercised not to injure or compress the dura mater, and not to permit the edge of the plaque to pass between the healthy skull and dura.

It is thought that this method has certain advantages over the use of metal plates, wiring, or cartilage, because of the calcium and magnesium content of bone and the existing system of canals. It has the further advantage of being economical, which is not unimportant in times of war. Since the combined sterilization by chemical and thermic means, they have had no difficulty with suppuration or breaking down of the bone-plaque.

Albert E. Morison[8] describes a method of **Autoplastic Transplantation of Bone** in injuries of the skull, dealing particularly with the late results of cases where bone has been removed. The symptoms naturally vary with the seat of injury; but even when the opening of the skull is small, and the area of the brain over which the bone is missing is such as to cause no pronounced local manifestations, most of the cases manifest a sequence of symptoms which, if not relieved, cause morbid self-consciousness, and sometimes even threaten insanity. The symptoms associated with this condition are: a feeling of insecurity and nervousness, especially fear of receiving a blow on the affected part; giddiness, more noticeable when stooping or turning quickly: headache and throbbing in the head after exertion; general malaise, lack of interest, and depression; partial or complete loss of consciousness, without any accompanying epileptiform seizure.

The symptoms have been associated with adhesions of the dura mater to the pericranium or scalp; but when these have been freed, and the attempt has been made to prevent further adhesions by some membrane such as interposed fascia lata, the troubles have not, in his experience, been entirely relieved. There seems to be little doubt that some alteration takes place in the cerebral circulation after loss of portions of the skull, and that this may produce these serious effects. The only effective and lasting remedy would seem to be restoration of the skull as far as possible to its original condition by a bone-grafting operation. Autoplastic grafting of bone yields the best results, and the anterior and internal surface of the tibia offers the most accessible area from which the graft can be taken. *Plate XLIX* shows a case before and after operation.

Technique of the Operation.—As a rule, it is not advisable to perform an operation within three months of the original wound being healed, as so many infected wounds, even when they appear to be soundly cicatrized, have in them foci of incarcerated sepsis. When these are disturbed, suppuration follows in the newly-made wounds, and failure of the operation is likely from this lighting up of infection. It is his custom before operation in all these cases to apply radiant heat locally to the scar; if any latent sepsis be present, it is shown by inflammation in the scar. In some cases the scar breaks down, allowing of the escape of a little pus.

After thorough washing of the head with carbolic lotion (1–40),

a tourniquet of elastic tubing is applied over dry sterile gauze round the head immediately above the ears. The operation area is isolated in the usual way by dry sterilized towels. The leg from which the bone-graft has to be taken is prepared in the same way, and covered by a sterilized towel until required.

A horseshoe-shaped incision, with the base downwards, extending about an inch beyond the opening in the skull, is made through the scalp only, and the flap thus made is separated from the pericranium and reflected downwards. The pericranium is incised round the opening about an eighth of an inch from its margin, the outer portion is separated from the skull about an inch all round, and the inner portion adherent to the bony edge is freed from it so that a periosteum detacher may pass under the skull between it and the dura mater round the opening. The pericranium adherent to the dura in the centre of the gap is thus freed at its margins, and lies between the brain and the bone-transplant when the latter is placed *in situ*. The dura is not opened unless there are symptoms present which indicate the need of doing this, such as attacks of general or local epilepsy, or if the brain cannot be felt pulsating over the whole area of the exposed surface. These are indications that the thickened dura may have to be removed and replaced by some other membrane, such as fascia lata. The outer table of bone is removed for about half an inch round the skull opening. The object of this is to make a ledge on which the new bone-graft rests. Measurements with a pair of compasses are now taken of the size of the tibial graft required. The head wound is covered with a mop wrung out of hot saline solution, and the leg from which the graft is to be obtained is laid bare.

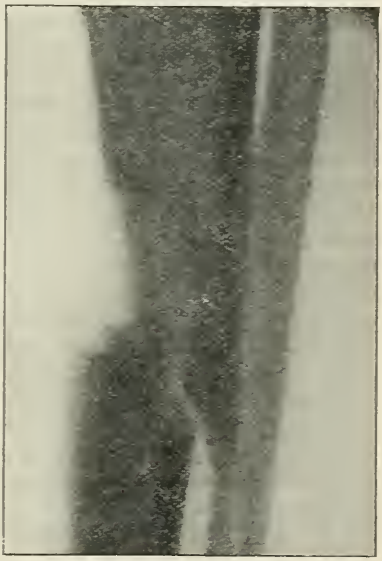


Fig. 109.—Tibia showing fracture the result of accident at the site from which the bone-graft was removed. The crest of the tibia was taken away.

The leg skin is washed with hot salt solution, and a vertical incision made over the tibia for the length required, down to, but not through, the periosteum. The periosteum is incised about an inch longer than the bone required, reflected to that extent, and laterally to the full extent of the tibia. It is important not to take the crest of the tibia in removing the graft, as, if it is removed, the tibia is so weakened that a slight accident may produce fracture (*Fig.* 109). The tibia is

sawn on each side to the depth corresponding to the thickness of the outer table of the skull, the upper and lower limits are chiselled to the required depth, and finally the portion of bone, with periosteum attached, is removed with a wide chisel. The graft is now trimmed with nibbling forceps to correspond to the shape of the skull opening and to fit it as accurately as possible.

The tibial graft is then laid on the ledge of the inner table. The separated pericranium is stitched with interrupted sutures of No. 2 catgut to the periosteum of the graft, thus fixing the graft in proper position. The scalp-flap is replaced in its original position, and sutured there with silkworm gut. The leg wound is closed with Michel's clips. Dressings of sterilized gauze wrung out of spirit, and wood-wool, are applied; the head tourniquet is removed, and a capelline bandage put on. Neither of the wounds is looked at for ten days, when the stitches and clips are removed.

After-progress.—All of the twenty-one cases on which the authors operated recovered very rapidly from the effects of the operation, and all have complained of their leg more than their head. Union of the graft to the skull appears to be rapid—in ten days it is quite secure—and no absorption of the bone has taken place so far as can be judged from clinical examination and by *x* rays. The general symptoms complained of before operation have disappeared, and some of the men have returned to duty. In all cases it has been noted that the grafted bone remained tender to pressure for from six to eight weeks after operation, but this has gradually disappeared.

Pflugradt,[9] in dealing with cranial defects following gunshot injury, refers to the earlier practice of endeavouring to close the defect by means of **Re-implantation of Bone Fragments.** There were the same objections to this as a primary measure as to primary closure of the wound: the danger of primary infection in gunshot wounds, now fully recognized. Moreover, as a preventive of prolapse of the brain, the measure was probably useless, for it was now generally agreed that prolapse was due, not to the presence of the aperture, but to inflammatory swelling of the brain substance. Hence the closure of cranial defects after gunshot injury should only be undertaken secondarily.

As regards infection, no operation should be performed unless the wound were absolutely healed. Prolonged observation was necessary to exclude the presence of deep latent foci, especially when the healing of the wound had been delayed by suppuration. The flap method was preferred to free transplantation.

Local anæsthesia was induced by subcutaneous or subaponeurotic injections of a solution of novocain-adrenalin (0·5 to 1 per cent). The scar on the skin was then either excised or cut round. Irregularities in the scar over the aperture were next smoothed down with the scalpel, care being taken not to open the subdural space; the dura was separated with a raspatory for about 1 cm. around the edge of

the defect. A certain amount of bleeding always occurred between the bone and the dura, but this was readily arrested, even in the neighbourhood of the large sinuses. Cicatricial deposits were next sliced off with a knife, so that a thin fibrous layer remained as a substitute for dura over the defect. Next, the bony edge of the defect was freshened. In forming the flap, it was necessary to take care that the soft parts of the flap were wider than the defect, and the pedicle should be chosen so that no kinking or stretching occurred on sliding the flap into position. For cutting the bone flap, Pflugradt used a straight, flat chisel, with as broad a blade as possible. With this, by short tangentially directed blows, a bony plate of the size of the defect to be covered, and consisting of tabula externa only, was cut out. The plate of bone almost invariably broke across in several places, but this was an advantage rather than otherwise, enabling the flap to be more readily modelled with the finger to the normal curve of the cranium. It was important that the edges of the bone-flap should lie in contact with the freshened edges of the defect ; the existence of any interval between them would result in the union of the periosteum and dura over the edge of the defect, with consequent cessation of the bone-formation by which the defect was ultimately closed. After sliding the flap into position, sutures were passed through the aponeurosis-periosteum layer, and finally through the edges of the skin incision.

Severe wounds of the scalp are often accompanied by extensive *denudation of the bone*, which affords an unsuitable soil for the growth of periosteal grafts and other soft parts. The floor of the wound is occupied by the roughened external plate of the skull denuded of its pericranium. In order to provide the growth of granulation on this bony surface, T. Labouré[10] suggests that numerous small perforations be made in the external table of the skull through which the diploe can sprout. Granulations then appear on the surface as small reddish projections, and afford an admirable background for the closure of the wound by grafts and soft parts.

A. B. Mitchell[11] suggests the use of very thin **Perforated Silver Plates.** The silver is rolled out a little thinner than an ordinary visiting card, and is then punched with holes one-eighth of an inch in diameter, as close together as possible. This has the advantage that, being very thin, it can readily be adapted to the convexity of the skull. The perforations lighten the plate, and admit of the escape of blood or other fluid, so that compression by the accumulation between the plate and the dura or brain is avoided.

For many years surgeons have attempted to use circular saws driven by some form of motor power, but with rather unsatisfactory results, on account of the danger from these instruments. R. E. Farr[12] describes a New **Method of Turning Down Bone-flaps on the Skull.** The instrument which he has designed may be introduced through a $\frac{5}{8}$-in. trephine opening, and slipped along between the skull and dura for approximately $2\frac{1}{2}$ in. It has two flexible metal guards

(*Fig.* 110) which indicate upon the outside of the skull the exact location of the dura guard beneath. With a 1½-in. motor-driven saw the bone may be divided along the line of the guard for the distance over which the dura is protected. The shank of the guard is made sufficiently thin to travel along the groove cut by the saw as the guard

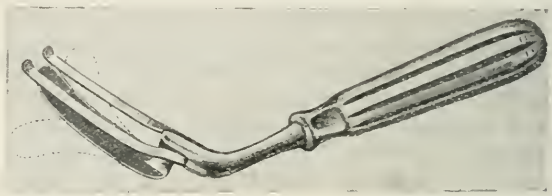


Fig. 110.—The dura guard for motor saw in Farr's method in turning down bone-flaps.

is advanced to a new position. Repeating this movement, the bone-flap may be outlined and raised in a very few minutes, with the minimum of trauma and physical exertion, and with safety. In order to advance the guard into a new position, it is desirable to cut

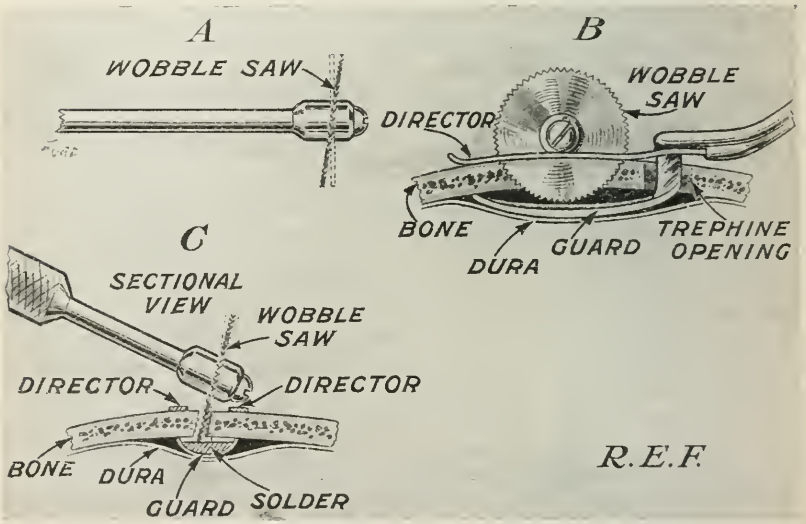


Fig. 111.—Farr's method of turning down bone-flap. Application of motor saw and guard.

a rather wide channel in the bone. To meet this condition, he makes use of the wobble-saw, by means of which a channel of any width may be cut. The width of the channel will depend upon the angle at which the saw is set on the arbor.

The dura guards are made in three forms: one is straight, one is

curved to the right, and the other to the left. This makes it possible to cut a channel in any direction desired. The guard proper is concave-convex, and the concave trough is filled with solder, so as to protect the teeth of the saw should they happen to come in contact

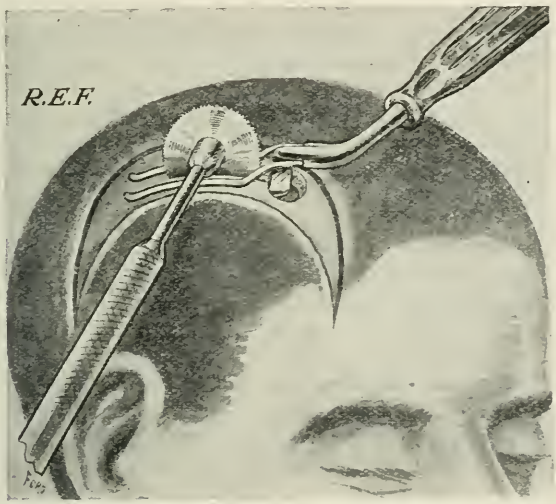


Fig. 112.—Farr's motor saw and guard in action.
(Figs. 110–112 *by kind permission of* '*Surgery, Gynecology, and Obstetrics.*')

with the guard. *Figs.* 111 and 112 show the application of the motor-saw and guard in action. Farr has used this guard repeatedly upon the cadaver, and has raised large bone-flaps in three cases upon the living subject, under local anæsthesia, and the guard seemed to work very satisfactorily.

Inter-relation between the Radiography and Surgery of Gunshot Wounds of the Head.

An interesting study of 1500 cases is presented by Gamlen and Smith.[13] They discuss (1) *The method employed* in taking the radiographs of the head; (2) *Their interpretation*; and (3) *The classification* of the types of injuries revealed.

1. Method of Taking the Radiographs.—They insist that stereoscopic views should be taken in every case, being firmly convinced of the paramount importance of this method, which enables one as it were to look right into the patient's head, and to view in relief the injury to the various strata as it really exists.

As a preliminary, a small lead-wire ring is placed over the wound surface, a clean new ring being used for each case. At the outset it is necessary to decide in what position it is best for the head to be

fixed for any given wound. In addition, the relation of a retained missile to the wound of entry, and the probable direction of any brain track, should be known. If time allows, therefore, a preliminary screening should be done, in order to give some idea of the position of the missile, which can generally be quite easily seen.

As a result of their experience and of many trials, they now always fix the patient's head in one of the seven positions which are described in detail. The position varies according to the situation of the wound. They find that the majority of wounds of the cranium occur over the temporoparietal area (50 per cent); next in order come those over the frontal area (25 per cent), and finally those over the occipital area.

2. Interpretation of Radiographs.—All those who have written on gunshot wounds of the head in the present war seem to be unanimous as to the great importance of a good *x*-ray photograph being taken as a preliminary to any operative interference, unless there be urgent reasons for performing an emergency operation.

Method of Localizing Foreign Bodies.—By the use of a pair of compasses and a scale, one can in a few seconds give the size and depth of a foreign body below the wound surface, once good stereoscopic negatives have been obtained, thus doing away with much of the elaborate machinery which has come into such prominence during the present war. On each plate appears the shadow of a pair of cross-wires at right angles to one another in close proximity to the plate. The tube is moved a known distance between the two exposures in a direction parallel to one of the cross-wires. This causes the shadow of any foreign body to shift along the line. By the use of a pair of compasses one measures the distance of the foreign body from the other wire in each case. The difference between the two measurements gives us the shift of the shadow. There is a simple geometric relation between the shift of the tube, the shift of the shadow, and the distance between the anticathode and the plate. The shadow shift having been measured, it requires only a moment's calculation by the use of a slide-rule to determine the depth of the missile.

Diagnosis of Fractures.—The dark shadow cast by a wound of the scalp, especially when there is considerable loss of tissue, is sometimes mistaken for a fracture; and the lighter markings due to the obstruction caused to the rays by some dressings, especially cyanide gauze, have to be kept in mind.

A fracture in the situation of the suture may be overlooked, especially if it is small and running in the same direction. Doubtful markings in the position of the Wormian bones present difficulties also. Fractures in the line of the sagittal suture cannot always be diagnosed if an ordinary lateral view is taken. The shadows of the ridges which go to form the bed of the superior longitudinal sinus overlap, and it is only by taking radiographs with the head tilted that they can be separated so as to bring clearly into view the line of the suture.

It is necessary to draw particular attention to a triangular shadow cast by the tip of the lesser wing of the sphenoid passing upwards and backwards, slightly in front of and parallel to the groove formed in the bone by the middle meningeal artery, as it is often overlapped by the one cast by the middle meningeal artery where it grooves the anterior and inferior parietal. Sometimes there was difficulty in giving a definite diagnosis in this situation.

In a large number of radiographs, the shadows cast by the diploic, meningeal, and other blood vessels of the brain are clearly shown, and in some cases difficulties have been found in distinguishing them from fractures. We have to take into consideration their length, shape, branchings, their thinning as they travel upwards to the vertex, and their presence on the opposite side of the cranium when the plates are viewed reversed. Lacunæ due to thinning of the cranium by Pacchionian bodies sometimes require the minutest attention, especially when there are scalp wounds in the neighbourhood.

The writers' experience has shown that with well-prepared plates, carefully examined, it is very rarely that a fracture, however minute, is missed.

3. Types of Injuries Revealed by Radiographs in Respect of the Need for Surgical Interference.

1. *No Fracture to be seen by X rays.*—Previous to the introduction of the helmet, these wounds could be safely left without surgical interference, but lately the authors have been impressed by a remarkable series of about six cases, all wounded on or about the apex of the temporal crest. These patients have come in but little affected, often showing no physical signs, or, at most, a slight facial weakness, paresis of one arm, or some aphasia. Their temperature and general condition on admission have given no cause for anxiety. They have remained well for two or three days, at the end of which time signs of cerebral mischief have suddenly revealed themselves. Fits, unamenable to bromide or morphia, increasing optic neuritis, severe headache progressing to drowsiness, with progression of focal symptoms, have all indicated urgent need for operation. On turning down a flap, at most a slight cracking of the temporal bone has been seen; more commonly there has been a considerable area of discoloration, a bluish appearance of the bone under the wound; in one case there was no change in the bone at all. There has been no extensive extradural hæmorrhage, but the dura has appeared discoloured and unhealthy. Underlying the dura, which was in most cases adherent to the subjacent brain by a layer of altered clot, a considerable cavity containing pulped brain and sanguineous material has been found in the temporal lobe. Evacuation of this collection, with drainage, caused a gradual amelioration of symptoms in all the cases.

2. *A small Bone Crack, usually limited in extent, with no sign of In-driven Fragments.*—These cases are generally left alone, as it is difficult to see what can be gained by operative interference.

3. *Extensive Fissured Fractures without Depression.*—These are often

serious, running down to and involving the base of the skull. They were not operated upon unless urgent symptoms manifested themselves.

4. *Gutter Fracture with only Limited Depression of the Inner Table.*—The outer table remains more or less in position. The injury is usually shallow, and as a rule the dura is only bruised. The authors usually operated for the removal of the depressed fragments in these cases, unless the fracture was over the superior longitudinal sinus.

5. *Gutter Fracture with Considerable In-driving of the Inner Table.*—The brain underlying the fracture is penetrated by bone fragments to a greater or less extent. The contour of the outer table is still more or less preserved. Every case in this class was operated on.

6. *Penetrating Wounds with no Missile in the Brain.*—In this class there is a definite defect involving both tables. Fragments of bone are driven into the brain to varying depths. Such cases almost invariably require operative interference, and at the operation a dirty brain-track is generally found containing bone fragments and pulped septic brain material.

7. *Wounds with one or more Missiles Retained, either in the Bones of the Skull or in the Brain.*—The missile may have passed entirely through both tables of the skull, and be lying between the inner surface of the skull and the dura, the dura still being intact. One or more missiles may be lying in the brain substance at varying depths from the wound of entry. (*See Plates L–LII*).

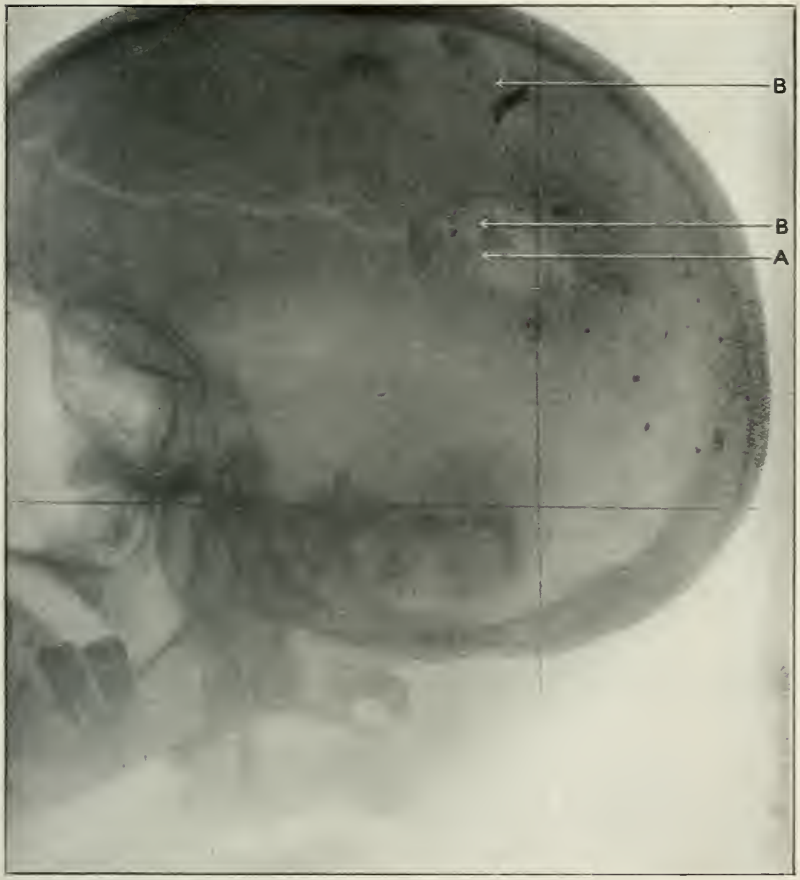
8. *Perforating Wounds, with Entry and Exit Wounds present in the Skull.*—Wounds of this type are comparatively rare. Biparietal perforating wounds—usually rifle-bullet—have been the most common examples, and often have inflicted surprisingly little damage. Perforating wounds of the frontal region have usually been very severe. [*Plates LIII, LIV* are illustrations of a case of this type of wound. We are indebted to the Medical Research Committee and to the *British Journal of Surgery* for permission to use them.]

Operative Treatment.—"Whilst tempted, in the early days, to operate on every case, and attempt removal of the missile if not too hopelessly inaccessible, lately we have adopted much more expectant treatment. If the missile be deep and the wound of entry clean, we have left it untouched unless urgent symptoms arise.

"When the wound of entry is septic, and especially if pulped brain be oozing from it, operative interference of some sort is imperative. Where the foreign body is inaccessible, two inches or more from the opening in the dura, it has been found advisable to do nothing more than clean up the wound of entry, removing the superficial in-driven bone fragments, and, if the track be not too hopelessly septic, drain by lateral rubber tubes placed in at the angles of the flap after excision and suture of the excised edges of the wound of entry. We have resorted to direct drainage of the track through the wound of entry for the most part only when we have judged it to be very septic.

PLATE L.

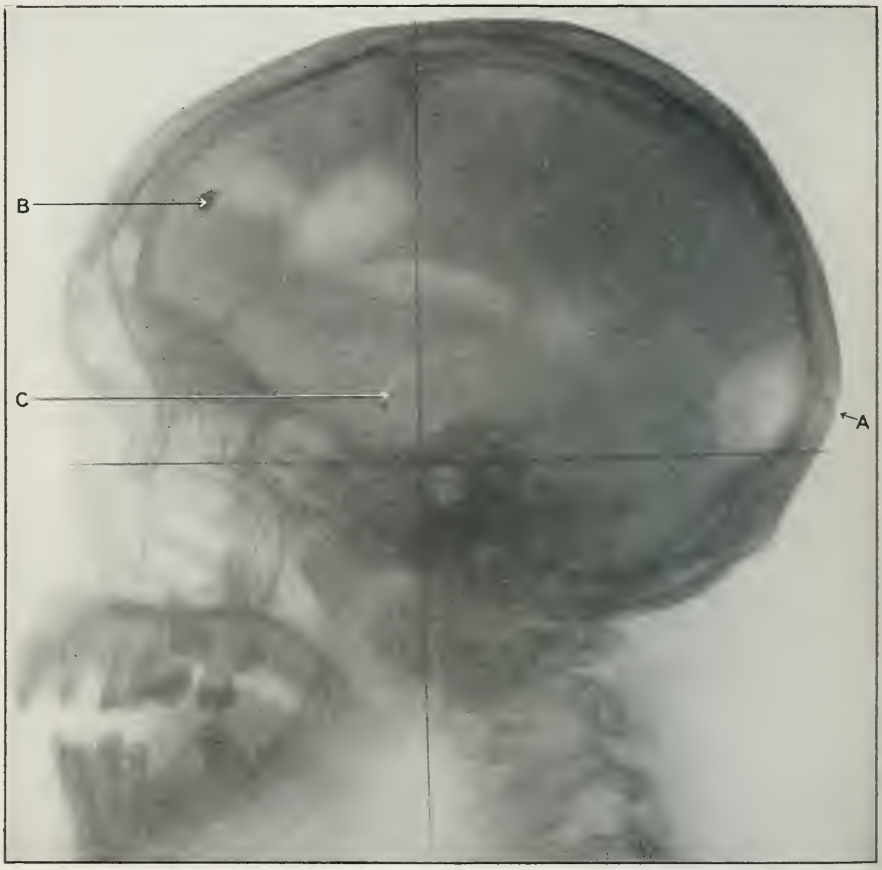
GUNSHOT WOUNDS OF THE HEAD



Patient died on day of admission. A, A large circular defect in the right posterior parietal region. Edges of defect are lined by numerous small metal fragments. All the larger fragments are in the wound track crossing the brain almost to the other side of the skull; B, Shows the largest fragments, all of which are furthest removed from the wound of entry. Extensive fissured fractures extend horizontally forwards to the frontal region and backwards to the upper occipital.

PLATE LI.

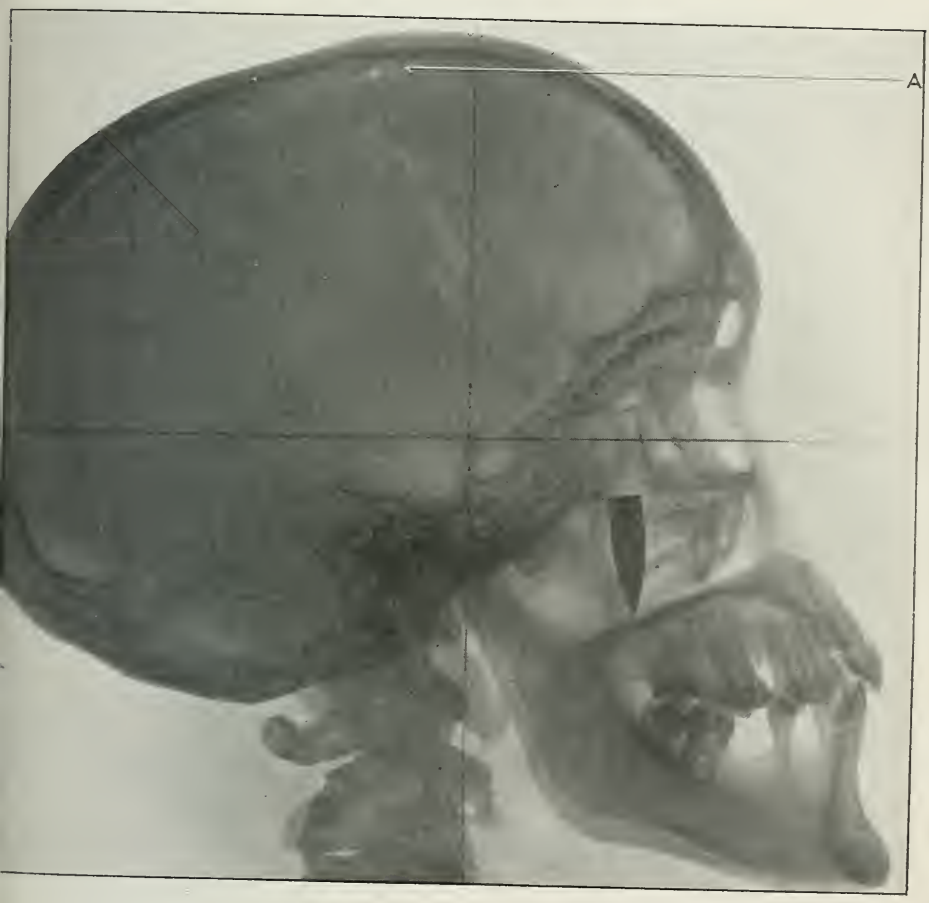
GUNSHOT WOUNDS OF THE HEAD—*continued*



Wound track through brain distended by infection with gas-forming organisms. A. Point of entrance; B. Small fragment of shell lying in end of track underneath pia mater. The large main track runs directly through the left cerebral hemisphere, and is much larger than the entering missile. Its wavy appearance is caused by side pockets of gas contained in tracks which pass laterally; C. A tiny fragment slightly above the pituitary gland lying at the end of a track which passes in a crescent direction downwards and forwards from about the middle of the main track. The patient survived for five days after this radiogram was ta'ken.

PLATE LII.

GUNSHOT WOUNDS OF THE HEAD—*continued*



A. Marks a tiny perforation of the skull near the vertex. From this a bullet has passed through the brain and the base of the skull just behind the right orbit, and is lying with the apex embedded in the hard palate. The track of the bullet is very faintly shown.

PLATE LIII.

GUNSHOT WOUNDS OF THE HEAD—*continued*

The same case as *Plate LIV*. Perforating wound of frontal region, showing large 'expressed' fragments of frontal bone, comprising both tables, between the wounds of exit and entry. The ring marks wound of entry.

PLATE LIV.

GUNSHOT WOUNDS OF THE HEAD—*continued*

The same case as *Plate LIII.* There is direct bruising of the scalp around the entry wound over the right frontal region. The hæmorrhage around the eyes has been extravasated from bleeding within the anterior fossa. The forehead is deformed by the uplifted fragment of the frontal bone.

" In one extraordinary case we were able to show by *x* rays a brain-track giving a peculiar wavy appearance, due, as autopsy subsequently revealed, to a gross infection of the track with gas-forming bacilli."

REFERENCES.—[1]*Presse Méd.* 1916, 421 ; [2]*Jour. Amer. Med. Assoc.* 1917, 1299 ; [3]*Brit. Med. Jour.* 1917, 492 ; [4]*Surg. Gyn. and Obst.* 1917, 248 ; [5]*Brit. Jour. Surg.* 1917, v, 42 ; [6]*Presse Méd.* 1917, 300 ; [7]*Ibid.* 60 ; [8]*Brit. Jour. Surg.* 1917, iv, 454 ; [9]*Brit. Med. Jour.* 1917, i, 307 ; [10]*Presse Méd.* 1917, 339 ; [11]*Brit. Jour. Surg.* 1917, v, 40 ; [12]*Surg. Gyn. and Obst.* 1917, i, 374 ; [13]*Brit. Jour. Surg.* 1917, v, 17.

SOLDIER'S HEART. (*See* HEART, SOLDIER'S.)

SORE THROAT, SEPTIC (EPIDEMIC). *E. W. Goodall, M.D.*

An epidemic of sore-throat in Galesville, Wis., U.S.A., during the spring of 1917, caused by milk contaminated by streptococci, has been recorded by E. C. Rosenow and C. L. v. Hess[1] and G. W. Henika and J. F. Thompson.[2] According to the latter, there were 325 cases in a community of 941 persons, and there were 9 fatal cases. The symptoms were those of acute inflammation of the fauces, with fever ; complications were frequent. A virulent streptococcus was found in the throats of the persons affected, and the same organism was recovered from the suspected milk. In the herd supplying the milk were six cows affected with mastitis, and two of them, besides having the local lesion, were in very poor general condition. In 2 of the 325 cases the disease was probably acquired by contact, and not directly by drinking the milk. In all the others the patients drank the infected milk ; 48 persons who drank the milk escaped the illness. The epidemic was apparently cut short by boiling the milk, a measure which was put in force before the actual source of the epidemic was discovered. The epidemic was of the same nature as the more extensive one which occurred in Chicago in the winter of 1911–12, and was reported in the MEDICAL ANNUAL, 1913, p. 508.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 1305 ; [2]*Ibid.* 1307.

SPASM (PROGRESSIVE [TORSION]) OF CHILDHOOD.

J. Ramsay Hunt, M.D.

There are many curious spasmodic manifestations occurring in childhood, e.g., chorea, athetosis, tic convulsif, and the various forms of myoclonias. In recent years considerable interest has been awakened by an affection which has been described as the 'progressive torsion spasm of childhood' by Ziehen, or as 'dystonia musculorum deformans' by Oppenheim. The affection was first described by Ziehen in 1910, and with rare exceptions is confined to descendants of Russian and Polish Jews. It is essentially a progressive torsion spasm of trunk and extremities, often associated with hypotonia, and sometimes with movements of a more clonic or rhythmic character, suggestive of chorea and athetosis. Tremor movements are occasionally noted. The characteristic feature is the

twisting and tractile quality of the spasm, with the attendant distortion of the trunk and extremities, and the bizarre disturbances of posture, gait, and station. Sensation is intact, and there are no symptoms of pyramidal-tract involvement. It is a progressive affection, with a limited symptomatology, and may eventually become stationary. In 1911, Oppenheim gave a more elaborate description of the disease, which he regarded as organic and not functional in nature, and emphasized the close relationship of the spasm to athetoid movements. Oppenheim further emphasized the association of hypotonia with hypertonia in these cases. The tendon reflexes often could be elicited only by reinforcement, and other evidences of muscular relaxation and flaccidity were present. This conjunction of hypotonus and hypertonus, the occurrence of clonic and tremor movements, and his view as to the organic nature of the affections, represent the chief differences from the original description of Ziehen.

Ramsay Hunt[1] has observed six cases of this curious disease. In all the clinical picture corresponded very closely to the descriptions of Ziehen and Oppenheim. In all save one, the affection began in childhood (6, 8, 9, 10, and 11 years, respectively), the exception being a typical case in which the first symptoms appeared at the age of 17 years. The sexes were equally divided, and all the patients, with one exception, were of Jewish origin.

The affection uniformly made its first appearance in one of the lower extremities, an interval of from one to two years elapsing in four of the cases before the opposite limb was involved. In one case, the distribution in the extremities was hemilateral for a period of nine years. In no case was the hand or arm the seat of primary involvement, although the upper extremities were affected in the later stages in three cases. The lower portion of the trunk and the lower extremities were always most constantly and most severely affected, and a slow but definite progression was noted in all the cases without exception. The muscles supplied by the cranial nerves were not affected, namely, those subserving the functions of articulation, facial expression, and the ocular excursions. In one of the severe cases, with high involvement of the neck muscles, there occurred, during an access of the motor paroxysms, slight contraction of the lower portion of the face, which was regarded as purely secondary, the result of a great effort to counteract the spasms. In one of the cases the motor disability was so severe and so distinctly limited to the lower extremities as to suggest a paraplegia or pseudo-paraplegic type.

The character of the motor disturbance varied somewhat in the different cases, in this harmonizing with the reports of other observers. The tonic or hypertonic form, with slow, torsion, twisting spasms of large muscle groups of the trunk and extremities, predominated and was observed in all the cases. Deforming functional contractures accompanied this type, which could always be overcome by strong passive movements.

There was also a more active stage, characterized by movements

of clonic or rhythmic character, accompanied by great motor agitation and unrest, suggesting somewhat the restlessness of chorea and athetosis. Two of the cases belonged to this type, and produced the clownish movements and the bizarre postures and progressions which suggested to Oppenheim such descriptive terms as the 'dromedary gait' and the 'monkey gait.' In these cases the face was flushed, there was sweating and tachycardia, and the general motor excitement was at times so extreme as to be most distressing and alarming, requiring at certain periods morphine and scopolamine for relief. In two patients running was better performed than walking, and retrograde progression was also noted. In the other patients the spasm was more tonic and much less active in character, and in bed or in a chair they rested with considerable comfort. In the late stage of this more tonic form a pseudoparalytic condition supervened, which was not paralysis in the ordinary sense, for some power of movement was retained, but paralytic so far as any voluntary control of the extremities was concerned.

Definite hypotonia was present in four cases, and in two it was absent; this is therefore not a constant symptom in all stages of the disease. The tendon reflexes were present in all, although usually elicited with difficulty, and often only after repeated attempts, or during some favourable moment of relaxation. Hypertrophy of certain muscle groups was occasionally observed, as well as slight general wasting in the late stage, but without degenerative electrical changes. None of the characteristic phenomena of myotonia were demonstrable in any of the author's cases.

There was no intelligence defect, and all of the patients were of average mental development. There were no hysterical manifestations or stigmata, and in none of the cases was there any tendency to stammering, impulsive speech, fixed ideas, or phobias, which are so common in the degenerative motor neuroses.

Generally speaking, the disease was always gradually progressive. Occasionally a slight improvement or remission was noted in some of the cases, but this was always of comparatively short duration.

The movements varied in quality and character in the different cases and at different stages of the disease. There was always spasm, occasionally tremor, and sometimes movements of a choreiform or athetoid type. In the early stage when an extremity is first affected, there is a disturbance in the harmony of movement; the foot turns outward or inward in walking, or the leg is thrown abruptly outward. In one case a fine tremor movement always preceded and accompanied the spasm. Later, the spasm becomes more and more prominent, and assumes the characteristic features of twisting and torsion, a variable hypertonia or dystonia in which the various muscle groups contract and relax.

After it is well advanced, the torsion spasm shows, therefore, a certain monotony or stereotypy, and, at rest, the only signs may be repeated dorsal flexion of an ankle, with an occasional spasmodic

flexion movement of the knee or hip. Any active movement, however, especially the effort to stand or walk, brings on a much wider dissemination of the spasm. The limbs are then drawn into weird postures or thrown out at strange angles, and walking or standing is quite impossible without assistance. In this stage the great involvement of the trunk muscles and hip girdle is quite apparent, producing lordosis with prominence of the buttocks, and lateral distortion of the trunk from spasm of the erector spinæ and abdominal muscles.

Nature of the Disease.—In agreement with Oppenheim and most subsequent observers, the author regards the progressive torsion spasm as an organic affection of the central nervous system. In favour of this view may be mentioned the gradual progression, the peculiar characteristics of the motor disturbance, its association with tremor, choreiform, and athetoid movements, the gradual generalization of the spasm until the entire voluntary musculature is involved, sparing only the muscles supplied by the cranial nerves, and finally the absolute chronicity of the clinical picture. There is also important negative evidence in the absence of hysterical stigmata and the mental characteristics of the convulsive tic, which usually play so important a rôle in the functional motor neuroses of hysterical or psychogenic origin.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1916, ii, 1430.

SPINAL CORD, ABSCESS OF. *J. Ramsay Hunt, M.D.*

Abscess of the spinal cord or of its membranes is a very rare complication : so rare, indeed, that the clinical criteria are not well known, and the true nature of the lesion is often not recognized during life. Such cases are usually regarded as acute myelitis, acute meningomyelitis, or meningitis. The abscess-formation may be limited to the substance of the spinal cord. An especially interesting group of cases is that of peridural abscess—a suppurative perimeningitis which permeates the loose areolar tissue of the perithecal space. This is often secondary to some neighbouring focus of inflammation, e.g., osteomyelitis of the spine, or peritoneal or pleural foci.

An abscess of the substance of the cord is described by C. W. Hitchcock.[1] The onset was acute, the affection terminating fatally in four weeks. The early symptoms were numbness and weakness of the left leg, followed by a unilateral girdle pain on the left side, and insufficiency of the vesical sphincter. The pain sense was impaired over the abdomen and the lower extremities. Tactile sensation was preserved. The motility of the right lower extremity was unimpaired. Three days later numbness and weakness of the right leg appeared, and the tendon reflexes of the lower extremities were abolished. Eventually complete paraplegia supervened, with dissociated anæsthesia below the level of the 12th dorsal segment. The blood-count showed 5,120,000 red blood cells. 12,400 white corpuscles, hæmoglobin 90 per cent. The temperature curve indicated infection. The man was a teamster with an infected wound of the hand resulting from

the bite of a horse. The motor paralysis and level of anæsthesia gradually ascended, and as the clinical picture suggested an infective process, a laminectomy was performed on the ninth day of the disease. The dura mater was opened, but the cord substance was not aspirated. Death occurred two weeks later, and the autopsy showed extensive abscess-formation in the lower dorsal and lumbar region of the spine.

The author comments on the failure to carry out exploratory puncture of the substance of the cord, pointing out that this might have led the way to incision and drainage of the abscess cavity.

W. J. Mixter[2] reports a case of epidural abscess of pyogenic origin in a boy 17 years of age. The onset was characterized by pains in the region of the left shoulder and left side of chest. Ten days later there developed retention of urine and weakness, with spasticity of legs, also headaches and rigidity of neck. This was rapidly followed by complete paraplegia. There was moderate elevation of temperature, rapid pulse and respiration, and evidences of infection in the blood (30,000 leucocytes). There was complete paralysis of motion and sensation below the 7th dorsal segment, with priapism and retention of urine. The tendon reflexes of the lower extremities were abolished, and the Babinski reflex was elicited on the right side. Kernig's sign was absent. The cerebrospinal fluid showed increase of albumin content, with slight yellow tint and no increase of cells.

Laminectomy was performed, with removal of the 3rd, 4th, 5th, and 6th dorsal laminæ. Beneath the 6th dorsal spine there was an epidural abscess, which extended from the region of the 3rd cervical to the 1st lumbar vertebræ, consisting of thick creamy pus, which yielded a pure culture of *Staphylococcus aureus*. The source of the infection was doubtful; but both acute tonsillitis and furunculosis were present, and were considered as possibilities. It was thought that osteomyelitis of the spine could be excluded.

Ayer and Viets[3] report a somewhat similar case, with development of an intraspinal epidural abscess, directly traceable to an infected wound of the right breast in a man 43 years of age. This healed, but a secondary infective focus developed in the deep muscles of the back, with extension into the spinal cord. There then followed the symptoms of acute compression of the spinal cord, with evidences of pressure in the cerebrospinal fluid—viz., xanthochromia; massive coagulation of the fluid soon after removal, this being of a slight yellowish tint; no increase of the cellular content.

[Some years ago the writer[4] emphasized the close relationship of acute osteomyelitis of the spine to what has been described as acute idiopathic suppuration of the peridural space, suppurative perimeningitis, and the like. A statistical study of 62 cases of acute osteomyelitis of the spine showed that perimeningeal suppuration had occurred in twenty-four cases, i.e., an accumulation of purulent material outside the dura mater in the loose areolar tissue of the spinal canal. Such inflammatory and suppurative processes outside of and encircling the dura were described as early as 1833 by Albers,

and termed by him perimeningitis meduliæ spinalis. Frank recorded similar cases under the title of peripachymeningitis, and both of these terms are in use at the present day. The infection of the peridural areolar tissue is secondary, and may usually be traced to some pathological process in the immediate neighbourhood, as the spine, thoracic or abdominal viscera, or sacral bedsores.

In addition to those cases in which the source of the infection could be demonstrated, a few observations have been recorded during the past twenty years, the majority by French observers, in which no such primary focus was apparent. Clinically their course was rapidly fatal, and attended by intense spinal irritative and paralytic symptoms, the autopsy revealing nothing but a peridural cellular tissue bathed in pus; so that in the course of time, as the number of carefully recorded observations has increased, an idiopathic infectious suppurative process has come to be recognized, originating in the vascular areolar tissue encompassing the dura mater. In other words, this loose cellular tissue has come to be regarded as a structure in which a pyogenic process may arise *per se*, independent of any other focus.

Systematic writers on nervous diseases are, generally speaking, very guarded in their brief remarks devoted to this subject, describing the general pathological characters of the peripachymeningitis, its mode of origin, and usually secondary nature. Others again touch on the obscure nature and uncertain origin of the so-called primary form. Gowers, in the last edition of his text-book, published in 1899, states that "it is certain that acute general external meningitis occurs as a primary disease, and may run an intensely rapid course, with profuse suppuration between the membranes and the bone." The present writer believes many of these cases result from acute osteomyelitis of the spine. The pathology of acute osteomyelitis shows great variations in the intensity of the bone lesions. The periosteum alone, or the periosteum and the superficial layers of bone, may represent the depth of the suppurative process, and the surface area may be proportionately small. It is therefore quite conceivable, in a complicated mechanism like the spine, with its innumerable surfaces and projections, that a small focus of periostitis or superficial necrosis could readily escape detection, or be regarded as a secondary effect. It is also quite obvious that if the abscess-formation were superficial it would, meeting with less resistance, burst at an earlier period into neighbouring structures. If this were to occur in the spinal canal, the result is easily conjectured.

These considerations, I think, show that primary perimeningitis as a clinical and pathological entity may justly be regarded with a spirit of scepticism, until strong positive evidence is brought to the contrary. A careful study and analysis of the recorded cases go far to disprove the theory of an idiopathic origin, and there was not a single recorded case of acute primary suppurative perimeningitis which did not accord perfectly in its clinical and pathological manifestations with our conception of the acute osteomyelitis of the spine.

It may be argued by some that the pressure of a minute focus of osteomyelitis does not materially affect the nature of the case, and that the lesion and symptoms are essentially those of a suppurative perimeningitis. Such a point of view would not only be scientifically inaccurate, but, from the practical standpoint, a dangerous one. It is of the first importance that the greatest stress should be laid upon the focal spinal symptoms, as not only indicating the true nature of the affection, but also the immediate necessity and site for operation.—J. R. H.]

References.—[1]*Jour. Amer. Med. Assoc.* 1917, 1318; [2]*Boston Med. and Surg. Jour.* 1916, Dec., 864; [3]*Ibid.* 865; [4]*Med. Rec.* 1914, April 23.

SPINE, SURGERY OF.

J. Ramsay Hunt, M.D.

Gunshot Wounds of the Spinal Cord.

Although injuries of the brain and peripheral nerves from gunshot wounds have been the subject of many monographs, wounds of the spinal cord have received but scant attention. This may be in part due to the gloomy prognosis and high mortality of this group of cases. The subject, however, offers an interesting field for investigation of the symptomatology and physiology of the spinal cord.

Guillain and Barré[1] report their personal experiences in 100 cases of spinal-cord injury. Of this number, 61 were caused by shell explosion, 23 by bullets, and 8 by shrapnel; 8 were the result of fracture. The level of the lesion was distributed as follows:—

C4, 4 cases	D5, 7 cases	D12, 4 cases
C5, 3 ,,	D6, 5 ,,	L1, 9 ,,
C8, 4 ,,	D7, 1 ,,	L2, 8 ,,
D1, 3 ,,	D8, 11 ,,	L3 2 ,,
D2, 6 ,,	D9, 10 ,,	L4, 2 ,,
D3, 4 ,,	D10, 5 ,,	L5, 3 ,,
D4, 5 ,,	D11, 5 ,,	Cauda equina 4 cases.

Symptoms.—In spinal injuries from gunshot wounds, *paraplegia* is usually complete; the muscle tonus during the first few days is but slightly modified, but very soon atrophy and diminution in the consistency of the muscles make their appearance. The neuromuscular contractility, as elicited by the percussion hammer, is well preserved for long periods of time, and only diminishes in the later stages of paralysis. The *tendon reflexes*, e.g., the knee-jerks, Achilles-jerks, and the medio-plantar reflexes, are abolished. In some cases of paraplegia in which the lesion has been incomplete, the initial loss of the tendon reflexes disappears and is replaced by exaggeration of the tendon-jerks, clonus, and hypertonicity. Reference is made to a posterior tibio-femoral reflex, which is elicited by tapping the inner surface of the tibia and which induces contraction of the flexors of the thigh, especially the external portion. This reflex has been observed with total abolition of other tendon reflexes of the lower extremity. *The plantar reflex* may display various types—e.g., no

response ; flexion of the toes ; the dissociated flexion of the big or the little toes ; flexion of the toes with absence of the fascia-lata response, and vice versa. *The cremasterie reflexes* are often preserved both on superficial stimulation and on deep pressure. Sometimes there is induced a slight reflex micturition, or tendency to priapism. *The abdominal reflexes* are usually abolished, and may show dissociation—e.g., preservation of the paramedian and loss of the lateral abdominal reflexes. There is a slight *reflex of defence* on pinching the skin of the dorsum of the foot, which induces hyperextension of the toes and flexion of the tarsus, but there were no examples of a typical reaction of defence, or 'stepping reflex,' such as are commonly noted in cases of spastic paralysis. Occasionally spontaneous spasms of the extremities were observed.

Spontaneous sensations of *pain* are usually absent excepting in the case of compression of the posterior columns or nerve roots by splinters of bone or fragments of projectiles. The level of anæsthesia is usually horizontal, sometimes *festonnée*, and surmounted by a zone of hyperæsthesia or hypæsthesia which indicates the condition of the superjacent segments. The conservation of sacral sensibility observed by Babinski in spinal-cord compression was not noted. The presence of dissociated anæsthesia above the line of anæsthesia would indicate the existence of an associated hæmatomyelia in the upper segments.

The *atrophy* in this group of cases is very rapid, and is both spinal and nutritional in origin, affecting not only the muscles but the subcutaneous tissues as well.

Retention of urine is the rule, incontinence being scarcely ever observed except as the overflow of retention. Spasm of the vesical sphincter is often very pronounced, and may require the use of metal sounds. In two cases of total section of the cord, the sensation of the necessity for urination, and the ability to satisfy this, were curiously preserved. *Incontinence of fæces* is frequent, but constipation is often very obstinate. *Priapism* is rare except in the first few hours after the injury ; a slight tendency to erections is not uncommon. *Œdema of the extremities* is also rare, excepting in chronic paraplegia.

The temperature of the paralyzed members is often elevated, and in hemisection of the cord the same was observed on the paralyzed side. In incomplete lesions, hypothermia is sometimes present, and occasionally above the line of anæsthesia there is a marked sensitiveness to cold. Spots of reddish discoloration, *tache rouge*, are frequently noted on the toes, malleoli, knees, and other points of pressure, and *bedsores* develop in some cases in spite of every precaution.

The authors lay great stress on the *general symptoms* of spinal injury, such as excessive thirst and insomnia in the early stage, and loss of appetite, rapid emaciation, and somnolence later. In cervical lesions, hyperthermia is often marked.

In the early stage an *abdominal syndrome*, which may suggest a true peritonitis, is sometimes observed. There are an arrest of gas and

fæces, pain, nausea, and vomiting, and swelling of the abdomen. This clinical picture is produced by small peritoneal hæmorrhages of sympathetic origin, the result of general abdominal vasodilatation. *Intestinal hæmorrhages*, with black diarrhœa and melæna, may accompany this syndrome.

Hæmaturia is not uncommon, and may precede any local infection. It is ascribed to a vasodilatation of the vesical mucosa, with consecutive hæmorrhage, and has the same pathology as the intestinal melæna. It is often quite profuse, and may produce a rapid anæmia. *Hyperazoturia* is often very conspicuous, and as much as 40 to 70 gr. of urea may be eliminated in a single day. This is regarded as a sign of denutrition, and is in keeping with the rapid emaciation and general nutritive decay which is observed in this group of cases. The chlorides are often extremely low. *Pyuria* indicates a local infection, and in the writer's experience is nearly always fatal.

The *cachexia* is a very marked symptom, and emaciation may develop more rapidly and to a more extreme degree than in a severe infectious disease. *Mentally*, the patients do not seem to realize the gravity of their condition, and as a rule do not complain. Sometimes a slight euphoria is noted.

Evolution and Prognosis.—This group of injuries is one of the gravest that is encountered. In 100 cases there were 80 deaths, and of the remainder it is certain that many died subsequently to their evacuation from the hospital. Only 4 cases showed improvement; in 2 of these the improvement was spontaneous, and 2 followed operative procedure.

Causes of Death.—Secondary infection of the urinary tract; in the authors' experience, ascending pyelonephritis is rare. Pulmonary infections (e.g. bronchopneumonia) are not uncommon. Ascending myelitis is very rare. A very common cause of death is purulent meningitis from infection of the wound. The principal factor, however, in the fatal outcome, is the progressive cachexia, due to blocking of the sympathetic control of the important glands and viscera of the abdomen.

Diagnosis.—Complete section of the cord, anatomical or physiological, is indicated by paralysis of motion and sensation, abolition of the tendon reflexes, and loss of the plantar reflexes, or perhaps preservation of plantar flexion of the toes. The presence of a Babinski reflex would indicate a partial lesion. In partial lesions, or incomplete section of the cord, motion and sensation are usually lost; or some movements of certain segments may be preserved, or the vibration sense may not be lost; the plantar reflex is usually abolished.

Hæmatomyelia, contrary to what is usually found in the spontaneous variety of this lesion, is generally accompanied by a loss of all sensation, the clinical picture being that of a complete transverse lesion. Often, however, a dissociation of anæsthesia—loss of pain temperature sense—may be demonstrated above the level of the lesion.

Dissociation of sensation characteristic of hæmatomyelia is usually the result of small hæmorrhages within the cord. These may be produced by *commotion of the cord.* The sensory loss is irregular, and may be of a dissociated variety; the tendon reflexes are not abolished, there is only a transitory sphincter disturbance, and the plantar reflex is of the extensor type.

Medullary compression by splinters of bone or fragments of projectiles is usually complicated by extensive injury to the cord, e.g., hæmatomyelia and softening. In rare cases, however, it may be the chief factor, producing root pains, exaggerated tendon reflexes, clonus, and incomplete paraplegia.

Radiography is of value in indicating the site of the projectile and the level of the bone lesion. The clinical symptoms must, however, be depended upon for the delimitation of the upper level of the cord lesion.

Treatment.—The wound should be **Explored** as early as possible, care being used to operate in a warm room. The dura mater should never be opened, even when an intradural or spinal hæmorrhage is suspected. If the dura is injured and torn by the projectile, the wound should be cleansed with warm salt solution. The authors regard suture of the spinal cord as useless. A projectile, if visible and accessible, either in the canal or the cord, may be removed. If, however, it has traversed the cord and become embedded in the bone, attempts at removal are usually useless, and may transform an incomplete into a complete medullary lesion. The **Medical Treatment** is of great importance, and it is insisted that the nurses in attendance wear rubber gloves in all their handling of these patients. special mechanical beds are used, so that proper care may be taken of the excreta and the bathing and cleansing of patients. Patients are **Catheterized** four times daily, when necessary with lavage of the bladder. **Urotropine** is also used. Frequent changes of posture to avoid pneumonia are advocated, and careful antisepsis of the naso-pharyngeal passages. To avoid bedsores, scrupulous cleanliness of the skin is necessary, requiring frequent washings with soap, water, and alcohol, thorough drying, and powdering with sterile talcum powder.

H. M. W. Gray[2] reviews the early treatment of gunshot injuries of the spinal cord. In the late period of spinal injury the patients are usually in poor condition, suffering from pulmonary or urinary complications, and the parts are obscured by masses of fibrous tissue. But in early cases the presence of fractured laminæ usually makes operation a comparatively simple matter; it is easy to perform under local anæsthesia, and thus avoid pulmonary complications, and the use of **Adrenalin** makes it practically bloodless. Operation in the early stages can be done with extraordinarily little upset to the patient; and out of a large number, the author has never seen a death which could be said to have been hastened by it.

In a casualty clearing station, during an action, a hurried selection

of cases for evacuation must be made. Under present conditions, only those which are most favourable must be retained. In all cases which are sent away by ambulance train, the urine should first be drawn off if retention be present.

Selection of Cases for Operation.—Roughly speaking, it may be said that operation is indicated or advisable at a casualty clearing station: (1) In the presence of incomplete paralysis of motion or sensation below the lesion, especially; (2) If *x* rays show displaced fragments of bone or the presence of a piece of metal in or near the cord; (3) When the symptoms of paralysis have developed after the infliction of the injury, unless due to inflammation in cases which have been 'lying out,' when operation is practically hopeless; (4) When pain, due to pressure on nerve roots, is excessive and uncontrollable; (5) In very exceptional cases, when the character of the wound is such that sepsis, although not already evident, is likely to develop and cause rapid death. In all other cases it is better, when feasible, that the patient should be evacuated without delay. In cases retained for more than a few hours in a casualty clearing station, **Urotropine** should be given as a routine, in an attempt to prevent cystitis. Too great care cannot be exercised in performing **Catheterization.**

Operative Details.—1. **Local Anæsthesia,** by infiltration down to and including the periosteum of the laminæ and articular processes. The patient should receive such a preparatory dose of **Morphine** or **Omnopon-Scopolamine** that he becomes drowsy. It is rarely necessary to use a small amount of chloroform at any stage, unless the track of the missile is followed into non-anæsthetized tissues. **Adrenalin** renders the field practically bloodless.

2. If the wound is in or near the mid-line, it should be carefully excised down to the bone, as in trephining operations. Suture is usually not advisable. If the wound is well to one side, a fresh incision should be made in the mid-line. This is sutured at the end of the operation, while the track of the missile is cleaned up and used for drainage purposes. **Carrel's Method** should be applied.

3. Set operations should be avoided. A typical laminectomy is rarely indicated. The laminæ can usually be nibbled away, as is done in most cases of trephining for depressed gunshot fracture, until healthy dura is exposed all round the injured area. All obstruction to the easy removal of fragments should be removed before any attempt is made to lift them out. The greatest delicacy should be exercised, especially if movement of these fragments causes pain or twitching. One of the great advantages of local anæsthesia is that the patient is capable of feeling such pain. This fact may prevent further gross injury to the cord.

4. If the wound is not sutured, if the dura has been opened, Carrel's method of after-treatment, with the patient lying on one or other side, should be carried out. If the dura is unopened, a **Gauze Pack** may be used.

C. J. Symonds,[3] in the Bradshaw Lecture, considers the important question of *laminectomy in gunshot injuries of the cord.* The function of the cord may be destroyed in the following ways: The missile may traverse and lacerate the structure, rendering recovery to a useful extent impossible; on account of its high velocity, it may produce by a concussion effect an acute necrosis of one or more segments without actually coming in contact with the cord; fragments of laminæ may be driven in, producing laceration and compression; the missile may be lodged in the canal external to or within the theca, and continue to exert injurious influences. Extravasated blood as a compressing force does not appear to have been encountered by Makins and others in the South African campaign, and the author has not found compression from this cause in those operated upon by himself and others associated with him; extravasation into the substance of the cord has been found, and as such is unrelievable by any operation.

Of the foregoing conditions, in-driven bone fragments and lodged missiles may be removed by operation. The damage inflicted, so far as the cord itself is concerned, cannot be undone, nor can it be mended by any surgical means. In the cauda equina, where we have to deal with nerve trunks capable, like peripheral nerves, of recovery from bruising and of union with restoration of conductivity, surgery holds out a more hopeful prospect.

Gunshot injuries of the spine and cord fall, like wounds elsewhere, under two heads: first, the open septic wound with fracture of the spinous processes and laminæ, associated with more or less injury to the cord; and, secondly, the closed wound where sepsis is absent.

Open and Suppurating Wounds.—In dealing with these septic wounds, it is most important to keep to the track of the wound, enlarging in any direction sufficiently to obtain access to its deepest part; no formal incision should be made, and when the injury is unilateral, the sound side should not be interfered with.

Should the dura mater be found punctured, or cerebrospinal fluid escape, no grave consequences need ensue. If the wound be treated by the open method, meningitis is unlikely to occur. It may be necessary, where the dura is widely lacerated, to remove fragments of bone or metal from the theca, and yet fatal meningitis may not occur. The author is strongly of opinion that these wounds should be treated, after careful **Irrigation,** by loose **Cyanide Gauze Packing,** or by the **Salt Pack** if preferred, and left open.

It can never be necessary to open the dura in these cases if found uninjured. Blood has not been found in sufficient quantities to cause compression, and any thought of suture of the trunks of the cauda equina must be dismissed. If intrathecal pressure is suspected, a **Lumbar Puncture,** if it can be made away from the wound, should give relief. In dealing with these wounds, no difference should be made between complete transverse lesions and the partial injuries; all require attention.

It will seldom be necessary to remove more than the fragments of bone to relieve the pressure or reach the missile. Excision and closure, where sepsis is established, lead to wide suppuration, and may determine a fatal issue. It is better to pack lightly with cyanide or iodoform gauze, or to dress with the salt pack.

Closed Wounds.—When the wound has closed and an aseptic operation can be carried out, the question of the removal of bullets and shell fragments arises. In complete transverse lesions, operation is only admissible for the relief of pain ; a lodged bullet or fragment may cause untold misery.

Where evidence of conductivity of the cord exists, is it necessary or wise in all cases to attempt removal of lodged missiles and bone fragments ? If so, should this be done as soon as the wounds have closed, or should an interval be allowed to determine how far spontaneous recovery is possible ? A lodged missile may be injurious in itself, as, for example, if it lies amongst the nerve trunks of the cauda equina, or if it be pressing on a spinal nerve in the intervertebral foramen. On the other hand, the depressed fragments upon which the bullet lies may be doing harm. The bullet may have penetrated the bone, fracturing and driving it in. Or, again, it may have passed through the canal, entering by an intervertebral foramen, and have become lodged in the body of a vertebra, where it is harmless. The answer to these two important questions is that operation should be undertaken when evidence of continuity of the cord exists, and that the sooner it can be done after the injury the better.

Injuries to the Cauda Equina.—The spinal cord terminates at the lower border of the first lumbar vertebra, the lumbar and sacral nerve roots occupying the rest of the canal. These, each composed of two trunks, one motor the other sensory, pass to their respective foramina, where the bundles unite to form the composite nerve. The separation of the two parts of the nerve trunks explains many of the irregular paralytic and anæsthetic results of injury.

Gunshot wounds may pick out particular nerve trunks, and it is possible to ascertain with exactness which have suffered. The level of origin of each being known, it is also possible to reach the injured trunk after opening the theca. Unlike the cord, these intraspinal nerve trunks correspond in structure with peripheral nerves, and possess a corresponding capacity for spontaneous recovery from bruising and partial laceration. If sutured, they may be expected to unite, with restoration of conductivity.

The diagnosis of these lesions does not present any difficulty when confined to the nerve trunks. In estimating, however, the prognosis, it is important to ascertain if there be any injury to the conus. Fortunately, recovery of power over the bladder and rectum usually occurs after a time. Pain in the legs and feet may be severe and last several months.

The important question arising in this part of the cord is that of suture of the nerve trunks, for in this direction lies the future of the

surgery of the cauda equina. Should suture be attempted as early as possible, and at the same time as an operation for removal of bone fragments? Past experience will lend support to delay, and so will the result of injuries to peripheral nerves. On the other hand, if full consideration be given to the findings recorded in late operations, and to the conditions found at autopsy, the advantages from early operation become obvious. Here it must be remarked that time must be allowed to elapse for the exclusion of simple concussion. The wound also may take from one to three weeks to heal, so that there will always be a fair period for observation.

Tumours of the Spinal Cord.

The surgical treatment of tumours of the spinal cord is discussed by W. J. Mixter,[4] using as his text 26 personal observations. The various pathological conditions found at operation or autopsy were as follows:—

Glioma, 2; cyst of the cord, 2; varix, 1; nerve-root tumours, 2; dural tumours, 1; malignant tumours of the spine, 3; metastatic malignant growths, 9; tuberculosis of the cord, 1; no pathological process found, 3 (it is probable that at least 2 of these, if they come to autopsy, will prove to be multiple sclerosis).

The following operations were performed, several patients being operated on twice:—

Laminectomy, 20, with no operative death; exploration of spine without laminectomy, 2, with 1 death from operative shock; craniectomy, 1, followed by death from pneumonia.

In the analysis of the clinical features, he refers to the following points as worthy of emphasis. Pain is usually supposed to be one of the cardinal symptoms, yet it is frequently absent; one patient had a little pain one night three years before operation, and at no time since, and in at least three other cases the pain had been very slight. All the cases with malignant metastases, however, had severe pain. An important positive sign, if present, is pain on pressure on the spinous processes. It is of great help in determining the level of the lesion. It was present in five of the series. Another important sign is a fixed upper level of cord disturbance. If this is present, it should be taken as a distinct indication for laminectomy. If the motor and sensory disturbances below are gradually increasing, and the upper limit remains fixed, a presumptive diagnosis of tumour is justifiable. One of the first sensory changes may be a loss of thermal sense, and for this reason it is an important, though often neglected, point. The examination of the spinal fluid is of great importance, particularly the various reactions for proteids, and should always be done. A spinal-fluid Wassermann is very valuable in ruling out syphilis; the blood Wassermann should not be taken as conclusive. The *x* rays are of much assistance, but if negative they should be disregarded, as intradural growths will usually give little or no

change, while those bone lesions which give positive findings are generally malignant.

Speaking of intramedullary growths, the author states that they may usually be recognized by a fusiform swelling of the cord, either general or on one side. If such swelling is present, the cord should be split longitudinally in the posterior column, care being taken not to injure the surface blood-vessels. Should it be necessary to cut such a vessel, it may be picked up and tied with fine silk. The incision may be from 2 to 5 cm. long, should be carried well into the cord, and be made with a very thin-bladed knife. Frazier's knife is excellent, but if not at hand a Gillette razor-blade answers quite well. If a tumour is encountered, the incision should be carried from the upper to the lower pole, and no attempt made to dissect it out. If not infiltrating, it will immediately begin to extrude. Do not pull it or do anything more than take a small fragment for pathological examination, and close up the wound with the expectation of doing a second stage two or three weeks later. At that time the tumour will often be found so completely extruded that it can be removed with little or no damage to the cord. [Elsberg suggested, and has applied successfully, this method of extrusion.—J. R. H.]

If the growth is malignant, surgery is, doubtless, ill-advised, except in the presence of very severe pain, or in the hope of using radium or *x* rays after a partial removal.

The Cerebrospinal Fluid as an Aid to Diagnosis in Surgical Chronic Spinal-cord Diseases.

Xanthochromia and other changes in the cerebrospinal fluid in chronic surgical affections of the spinal cord are discussed by Elsberg and Rochfort.[5] Their study is based on an analysis of the cerebrospinal fluids of 92 patients with chronic spinal-cord disease. In all of the cases the spinal fluid was examined for increased protein or globulin and for its reaction to Fehling's solution, and a cell count and Wassermann test were made. The colour of the fluid and the presence or the absence of spontaneous clotting were also carefully noted.

The authors conclude that xanthochromia is strongly suggestive of spinal-cord tumour, occurring in the lower dorsal and lumbar regions. The combination of yellowness, high protein content, spontaneous coagulation, and pleocytosis (Froin's syndrome) is characteristic of the large endotheliomas or sarcomas surrounding the conus and the roots of the cauda equina. Nonne's syndrome (increase of globulin, without increase of cells) is suggestive of extramedullary spinal-cord tumour. The increase of globulin without an increase of cells, plus yellow discoloration of the fluid, make the diagnosis of extramedullary spinal-cord tumour very probable. The changes in the fluid may be a valuable aid for the differentiation between spinal diseases in which operative interference may be neces-

sary. The diagnosis of a spinal disease should never be made from the spinal-fluid findings alone ; the results of the examination of the fluid obtained by lumbar puncture should be used only as a diagnostic aid. (*See also* LUMBAR PUNCTURE.)

REFERENCES.—[1]*Presse Méd.* 1916, 497 ; [2]*Brit. Med. Jour.* 1917, 44 ; [3]*Lancet*, 1917, 93 ; [4]*Boston Med. and Surg. Jour.* 1917, 452 ; [5]*Jour. Amer. Med. Assoc.* 1917, i, 1802.

SPINE, TUBERCULOSIS OF. (*See* TUBERCULOSIS, VERTEBRAL.)

SPIROCHÆTOSIS. (*See* JAUNDICE, INFECTIVE.)

SPLENIC ANÆMIA OF INFANTS (von JAKSCH'S ANÆMIA).

Frederick Langmead, M.D., F.R.C.P.

ETIOLOGY.—R. G. Stillman[1] points out that von Jaksch noted that the condition was often associated with rickets, and that he was of opinion that rickets also played a part in causation. Yet he recognized that it could occur in non-rickety children, and several cases are on record. There is a certain relationship between it and rickets. This author does not go so far as Marfan, who holds that von Jaksch's disease is rickets, but concludes from the available evidence that it is due to the action of toxic or infectious agents which may or may not at the same time produce rickets. Either rickets or this form of anæmia may exist alone, but they occur together too frequently to avoid the conclusion that they are in some way related.

He gives a careful summary of the pathological changes, of which those in the spleen are the most important. In this organ there are three chief changes : connective-tissue increase, atrophy of Malpighian corpuscles, and myeloid metaplasia.

SYMPTOMS.—These are chiefly those of anæmia in general—pallor, œdema, weakness, dyspnœa, coupled with a large liver, a very large spleen, and a characteristic blood picture. Occasionally there is enlargement of the lymphatic glands, and there may be fever. The onset is gradual, and may be masked by the presence of syphilis, of tubercle, or of rickets. Diagnosis is made by blood examination. There is great diminution in the hæmoglobin and number of red cells. The colour index is generally low. Nucleated red cells are usually present, including megaloblasts when the nucleated cells are abundant. One type of cells is notable. Its nucleus shows the radiation considered typical of the megaloblastic nucleus, while the cytoplasm is intensely polychromatophilic, having a peculiar slaty-blue colour. The nuclear structure and the presence of many intermediate forms render it probable that these cells are parent red cells. One of the most important criteria is the leucocytosis, chiefly of lymphocytes. Myelocytes are not constant, but are generally found.

PROGNOSIS is serious but not hopeless. Many of the fatal cases end by intercurrent infection. Recovery is slow, and the blood remains abnormal for some time after the patient is otherwise well. If a factor such as syphilis is present, the outlook is more hopeful.

PLATE LV.

SPOROTRICHOSIS

(GREIG'S CASE.)

By kind permission of Mr. D. M. Greig and the 'Edin'burgh Medical Journal'

TREATMENT.—This is unsatisfactory. Some cases improve under any form of treatment; others continue to a fatal issue despite all therapeutic measures. In a few cases in which there is evidence of a cause, its treatment results in cure. **Iron, Quinine, Sunshine, Fresh Air,** and change of climate have all been recommended. Stoos achieved good results with **Arsenic,** and Stettner with **Thorium-X.** Stillman, including three of his own, reports six cases in which **Splenectomy** has been performed. In all the operation was followed by immediate clinical improvement. One case (Wolff's) was followed for three years, and although apparently well, still had a leucocyte count of 20,000. In another (Graff's) the blood was reported as being nearly normal nine months after operation.

Fowler's case was followed for only five weeks, and during that time there was no change in the blood beyond an increase in the hæmoglobin. In Stillman's own first case, although the child was apparently well eighteen months after operation, the blood picture was essentially the same as on her first admission to hospital two and a half years before. His second case died from bronchopneumonia before any results could be seen. His third, eight months later, still had a leucocytosis of over 20,000. It follows that the spleen is not alone at fault; but that the other blood-forming organs are also involved, and he finds it difficult to understand how its removal can be beneficial. Yet the fact remains that of these six cases, lasting improvement followed splenectomy in five.

REFERENCE.—[1]*Amer. Jour. Med. Sci.* 1917, i, 218.

SPOROTRICHOSIS. *E. Graham Little, M.D., F.R.C.P.*

Greig[1] reports a very interesting and instructive case of this disease which had escaped identification for three years, during which erroneous diagnoses of tubercle and syphilis had led to the employment of excisions, vaccines, and salvarsan injections, without staying the disease. It had apparently been contracted by abrading the little finger of the right hand against a rock while mining in South Africa in December, 1910. When seen by Greig, in March, 1913, there was an extensive ulcerated and partially-scarred area, best depicted in *Plate LV.* The actual demonstration of the organisms of sporotrichosis was not made, but the author claims that that diagnosis was reached by elimination of all other possibilities, such as tubercle, syphilis, carcinoma, actinomycosis, and streptothricosis. The man recovered perfectly under the administration of **Iodide of Potassium,** in doses commencing at 10 gr. and quickly pushed to 25 gr. three times a day, a dose which was maintained except for infrequent remissions when there was nausea of the drug. The sole local dressing employed was the painting of the surface with 2 per cent **Spirituous Iodine Lotion** twice daily. Healing, however, took nine months before it was completed, and the cure was marred chiefly by the results of the quite unnecessary surgical measures which had been undertaken under mistaken impressions of the disease.

REFERENCE.—[1]*Edin. Med. Jour.* 1917, 42.

STAMMERING. *J. S. Fraser, M.B., F.R.C.S.*

May Kirk Scripture and Eugene Jackson[1] remark that probably no human affliction has been more exploited by heartless charlatans than stuttering. Stutterers are taught to speak in an unnatural voice, to use sing-song or very loud tones, and so on. They have been taught to speak beating time with the arm or nodding the head, or to clench the fist on difficult sounds for the sake of distraction. Such schemes never relieve a stutterer of anything but his money, though in some of the methods there are suggestions of value.

The fundamental aim of the teacher should be to cure the pupils by showing them the correct speech habits, which include proper posture, respiration, articulation, phonation, fluency, and thinking. Every pupil should be carefully examined for organic defects in the organs of speech and for nerve troubles. The personal and family history of every case should be investigated. The actual correction of the speech defect is largely pedagogic and falls within the realm of the properly-trained speech teacher. It requires time and infinite patience on the part of the pupil and teacher.

Posture.—The chest should be held so that the air may be freely inhaled and exhaled, and the head should be at right angles with the body. When sitting, the pupil should not slide down in the seat nor bend forward, but sit up straight with his back resting comfortably against the back of the seat. Above all things, the pupil should be perfectly relaxed.

Breathing.—Breathing exercises for stutterers are of two kinds—deep breathing for increasing the lung capacity, and exercises for breath control in speaking. It does not matter which of the numberless good deep-breathing exercises are used, so long as they are properly performed. After the patients have learned the speaking breath, they should sound a vowel on the outgoing breath and hold it as long as the breath lasts without straining, etc.

Phonation.—Most stutterers phonate improperly. Their voices lack flexibility, and they speak in a monotonous manner. Singing scales, arpeggios, and songs, exercises in speaking and reading, with special attention to intonation and melody, lead to good results.

Articulation.—Pupils should be taught the exact position of the speech organs for each vowel and consonant. Each sound should be drilled first by itself, then in words, and finally in sentences. The vowel is the most important part of every word, and it must be lengthened and strengthened.

Fluency and Thinking.—The stutterer soon learns to read and repeat sentences with smoothness and facility. When, however, he has to speak spontaneously, he quickly reverts to his old habit. This is due to fear that he will not speak correctly. He must therefore be convinced that he can speak properly. At first the stutterer should read and repeat sentences together with other pupils, and then alone. The next step is reading sentences in which words are to be supplied, etc. Then comes the answering of simple questions,

and finally the re-telling of stories and argumentation. Exercises in rhythm are most valuable in obtaining fluency, proceeding from rhythm in music to rhythm in poetry.

Results Attainable.—It is not possible to cure every stutterer, but if properly treated early enough, most cases can be permanently cured and all cases alleviated. Young children yield easily to treatment, as they have not acquired the mental attitude of the adult stutterer. After progress has been made in the classroom, the teacher should take his pupil out upon the street and get him to ask passers-by or policemen the way to certain places. Under the teacher's supervision the pupil should telephone, and order things in stores, so that he may acquire the ability to speak properly in all situations.

Tompkins[2] supports the speech interference theory of stammering, which he puts as follows: (1) A child suffers an accidental or incidental interruption to his speech; (2) He makes a conscious effort to overcome the interruption; (3) Since speech is largely automatic, the conscious effort is misdirected and constitutes an impediment; (4) The child continues the conscious effort in order to overcome the impediment, not realizing that the effort makes the impediment.

It is the universal experience that females stammer less than males, especially in adult life.

References.—[1]*Laryngoscope*, 1917, Feb., 74; [2]*N. Y. Med. Jour.* 1917, Aug. 4, 241.

STATUS LYMPHATICUS. *Frederick Langmead, M.D., F.R.C.P.*

H. C. Cameron[1] states that this condition is found in more than 40 per cent of children examined after death at Guy's Hospital, who have not emaciated or been dehydrated by a long illness. Unlike other observers who have noted this great frequency, he does not regard it as the normal, for it is almost always accompanied, in his experience, by adenoid vegetations, enlarged tonsils, and enlarged cervical glands. He suggests that the hyperplasia of lymphatic tissue is an evidence, persistent after death, of chronic irritation in the corresponding mucous membranes by protracted, though perhaps quiescent, catarrhal infection. After death the mucous membranes may show no trace of catarrhal reaction, but the enlarged glands remain as evidence of its presence during life.

In his view it is not difficult to recognize during life a common condition which may be given the name '*status catarrhalis*,' and is the clinical analogue of the post-mortem condition, '*status lymphaticus*.' Children suffering from it are afflicted by a succession of catarrhs. Skin, conjunctiva, the mucous membranes of the ear, nose, naso-pharynx, bronchi, intestine, are all involved in chronic catarrhal processes, which from time to time show exacerbations, with the result that hardly a week passes without a pyrexial attack. In typical examples, the children are fat and watery, with rounded, exaggeratedly infantile bodies. The feet and hands are cold and blue, the hair is sparse, dry, and irregular in its growth, so that the margin

of the hairy scalp lacks definition. The skin on the cheeks and the point of the chin is reddened and infiltrated with papular eczema. There is often intertrigo behind the ear or in the flexures of the limb. The upper lip is red and sore from irritation of the chronic nasal discharge. Mouth-breathing is the rule, because of the large tonsils and adenoid vegetations, the lips being large, everted, and open, and often showing cracks and fissures. The chest for the same reason is contracted, and contrasts with the swollen and often pigmented abdomen. The stools are apt to be loose, and often contain mucus. The conjunctivæ are injected. In boys preputial irritation is common, and in girls vaginal catarrh. Otitis media is very frequent. The teeth decay easily and show circular caries. Urticaria papulata is often a symptom. Tempers are usually violent, and intelligence is below normal. The appetite is excessive.

The symptom of chief importance is the wateriness of the tissues, giving a fictitious appearance of health. They are in reality atrophic children, and if a higher pyrexia supervenes, the water is rapidly turned out of the body and the atrophy is unmasked.

Treatment.—This should be directed towards the achieving of a less watery habit of body. The condition is dependent partly on hereditary factors, but it develops unchecked only, when hygiene is faulty and when the diet is excessive and unsuitable. It is very closely dependent upon the enormous consumption of carbohydrate which is in vogue. Local treatment alone is little likely to be efficacious. He also considers that *status catarrhalis* has a very intimate relation to rheumatism, the latter developing when the catarrhal organisms enter the blood-stream. *Status catarrhalis* also renders the child liable to tuberculosis and to sudden death at the onset of virulent infections such as those due to pneumococci, measles, and diphtheria.

Reference.—[1]*Brit. Med. Jour.* 1917, i, 753.

STOMACH, CANCER OF. *Robert Hutchison, M.D., F.R.C.P.*

It seems to be generally agreed that **X-Ray Examination** affords the best chance of diagnosing carcinoma of the stomach in its early and operable stage. Of recent papers on the subject, one of the best is by Baetjer and Fredenwald,[1] whose general conclusions are :—

The Röntgen ray offers most valuable assistance as an aid in the diagnosis of gastric carcinoma ; and this is especially true when the lesion is situated in the so-called silent area. It should not be relied upon alone in the diagnosis of early cases without a strict consideration of the clinical aspect of the disease ; but, when taken in conjunction with the other signs, it is of the greatest diagnostic value.

Indurated gastric ulcers give röntgenograms similar to those of carcinoma ; but inasmuch as ulcers are frequently precursors of cancer, they may be grouped for practical purposes in the same class. It is often possible to determine their true nature only by microscopic examination of the excised area.

In the diagnosis of carcinoma two conditions must be taken into consideration: first, the peristaltic waves of the stomach; and second, the morphological defect in the stomach.

In carcinoma of the cardiac area of the stomach there is usually a filling defect present, the activity of the stomach itself being normal, and, unless the lesion be very extensive, there is no interruption in the peristaltic waves. In lesions of the body of the stomach, the peristaltic waves are interrupted in their course at the seat of the lesion, because the lesion itself is hard and indurated, and does not admit of further peristaltic movements. There is also present a persistent filling defect. In pylorie carcinoma there are usually signs of early obstruction in addition to a filling defect of small or large size, according to the extent of the growth.

In carcinoma, unless there be obstruction, hypermotility is always present, with rapid evacuation of contents. In ulcer there is hypermotility with pylorospasm, and more or less retention of contents. In carcinoma the filling defect is generally surrounded by an invasive area, interfering with the motility, and producing a large dead area, whereas in ulcer the filling defect is much smaller, and is not so apt to interfere with the immediate peristaltic waves.

The Röntgen ray furnishes us with important evidence regarding the operability or non-operability of the growth, pointing out, as it does, the location and extent of the growth, together with the degree of obstruction and the amount of involvement.

Negative findings are at times quite as important as positive ones, inasmuch as absence of the various x-ray signs of cancer affords presumptive evidence of the absence of this affection.

Boggs[2] is of opinion that the x rays will reveal more cancers in the early stage than any other method of examination. He lays stress on the fact that the diagnosis must be made from the study of a number of serial radiograms and from the behaviour of the stomach as observed on the screen, rather than from a single x-ray picture. Filling defects, obstruction, dilatation, and irregularity of outline are the points to look for. The proper interpretation of these is not always easy, and demands much skill and experience in x-ray work (p. 43).

References.—[1]*Johns Hop. Hosp. Bull.* 1916, Aug., 221; [2]*N. Y. Med. Jour.* 1917, ii, 341.

STOMACH, SYPHILIS OF. *Robert Hutchison, M.D., F.R.C.P.*

An account of recent work on syphilis of the stomach was given in the Annual for 1916 (p. 538), and the following conclusions by Eusterman[1] from a study of twenty-three cases at the Mayo clinic are a useful addition to what has already been published on the subject:—

Syphilis of the stomach, though rare, is not as infrequent as is generally supposed. The aid of the Wassermann-Noguchi reaction and Röntgen rays are necessary to establish the presence and the

specificity of the lesion. Denial of the disease, lack of evidence pointing to a primary lesion, or absence of positive Wassermann reaction does not exclude the possibility of gastric syphilis.

The diagnosis is based on a history of infection, a consistent positive Wassermann reaction, undisputable evidence of a gross gastric lesion, and—excluding cases showing irreparable extensive disease—a permanent cure by purely antisyphilitic measures. The diagnosis is often accidental. The possibility of syphilis should be considered in every atypical case, or in those not responding to ordinary methods of medical management.

The symptomatology which is fairly characteristic of gastric syphilis is suggestive of benign gastric ulcer; the gastric chemistry and Röntgen findings rather suggest carcinoma. The average age of patients with acquired syphilis of the stomach is about 35; the duration of the complaint averages three years. In most instances the condition is characterized by an initial intermittent course, followed soon by continuous symptoms and associated with epigastric pain of variable degree, felt shortly after taking food and not relieved by food or alkalies. From the outset there is a tendency toward emesis, a variable degree of flatulency, good appetite, infrequency of hæmorrhage and palpable tumour, diffuse abdominal resistance, a progressive course, and marked loss in weight without cachexia.

Anacidity or achylia is characteristic of the majority, if not of all, cases of actual gastric syphilis. This can be explained by the influence of the pathological process upon the gastric mucous membrane.

Extensive gastric involvement is frequently present at the time when gastric disturbance first becomes manifest.

A gummatous ulcer, usually multiple, and especially a diffuse syphilitic infiltration with variable degree of contracture (fibrous hyperplasia), thickening, deformity, and perigastric adhesions chiefly involving the pyloric segment, is the usual pathological condition. Demonstration of the presence of *Spirochæta pallida* in the resected tissue would be final proof of specificity.

Results from antispecific treatment are encouraging in all but very advanced cases. Surgical interference is indicated in certain cases. Early diagnosis and intensive treatment invariably result in symptomatic cure and structural improvement.

Reference.—[1]*Amer. Jour. Med. Sci.* 1917, i, 21.

STOMACH, ULCER OF.

Robert Hutchison, M.D., F.R.C.P.

Rafsky[1] points out how difficult it is to persuade many patients with gastric or duodenal ulcer to lie up for a proper course of treatment. He claims to have had success in a large number of cases by a plan which can be carried out without seriously interfering with the patient's occupation. He describes it thus:—

I first impress the patient with the fact that he must save as much energy and vitality as possible. His daily routine is gone over, and

he is instructed to avoid as much as possible useless exertions. A patient accustomed to walking very much should now ride; wherever the opportunity presents itself he should sit and not stand. In the evening upon his return from business he is required to retire about one hour after a light dinner. He is advised to lie in bed at least eleven hours, although he may not be able to sleep all of that time. Once a week the patient must stay in bed continuously for a period of twenty-four hours. This period of restricted activity is of great importance in the successful management of these cases. It must be continued for about three months. From then on, the patient is gradually allowed more freedom from his rest.

For the first twenty-four hours he is put on a strict **Milk Diet.** He is given 1½ quarts of milk daily, 8 oz. at a time at intervals of two and one half hours. He is permitted to have small quantities of water at frequent intervals. On the second day the milk diet is continued, but the quantity is increased to 2½ quarts. An ounce of cream is added to the morning, noon, and evening portions. On the third day three pieces of toast and 1 oz of butter are added. At about this time the patients will often complain of hunger, but this should not alter the plan of treatment. The weight of the patient is the best guide as to whether the diet is being well tolerated. From the fourth to the seventh day cocoa is substituted for the milk every morning. During this period two eggs are added daily. These can be given soft boiled, poached, coddled, or as egg nog. The quantity of the toast is increased to six pieces daily. If the milk is taken without any difficulty, it is increased to 3 quarts a day. On the eighth day, and up till the tenth, cereals are given, as rice and fine oatmeal. These should be served with sweet cream, and no more than three ounces of the cereal are allowed at one time. After the tenth day small quantities of tea and coffee are permitted, just enough to give the flavour. At the same time this serves to vary the monotony of the milk. Butter should now be given in as liberal quantities as the patient's digestive system will tolerate. Vegetables are added from the tenth to the fourteenth day. They must not be given fresh, but in the form of purées, or thoroughly cooked and ground up. Chopped chicken and a small quantity of light fish, as sole, whiting, or fresh haddock, can be allowed from the fourteenth day. On the twenty-first day scraped and chopped meat is added. The quantity of toast can be increased now, and crackers or zweibach added.

This plan is followed for three months. The patient must be continuously advised to eat slowly and take small quantities of food at frequent intervals. This cannot be impressed upon him too often. Certain variations in the diet will have to be made from time to time according to the patient's habits, desires, and tolerance for the diet. Individual idiosyncrasies for certain articles must be respected, and in this class of patients we may have to substitute for some article another variety of equal caloric value. At the end of three months the patient is permitted to have bread, chicken, and roast beef. The

latter need not be scraped or chopped. At the end of the fifth month cherries, peaches, and fresh vegetables are given. A full diet is permitted at the beginning of the seventh month.

Medication is necessary, but is not the important factor. Half an ounce of **Olive Oil** is given every night before the patient retires (p. 21). This is continued throughout the entire course of the treatment. Half an ounce of **Bismuth Subcarbonate** is taken half an hour before rising. This is kept up for three months. For the constipation usually present a powder composed 10 gr. sodium bicarbonate and 10 gr. calcined magnesia is given every four hours. The interval between doses can be increased or diminished according to the resulting laxative action. This powder is continued for six months. If pain is present, $\frac{1}{8}$ gr. of the extract of belladonna foliorum is given twice daily.

REFERENCE.—[1]*N. Y. Med. Jour.* 1917, ii, 212.

STOMACH AND DUODENUM, SURGERY OF.

E. Wyllys Andrews, M.D., F.A.C.S. (Chicago).

Surgeons have become more hesitant about operating in cases of gastric and duodenal ulcer, for several reasons. As more and more series of such operations are reported, the mortality has not declined, as one would expect, when surgeons became more experienced. Coffey[1] has collected statistics showing that the mortality, including gastric operations of all sorts, averages over 6 per cent. Finney's for 200 cases was 6 per cent; von Eiselsberg's for 450 cases was 8·3 per cent; for the staff of the Massachusetts General Hospital in 167 cases, it was 10 per cent; in the Roosevelt Hospital, New York City, it was 10 per cent of 184 cases. In his own series it was 5·5 per cent in 150 cases, and significantly, was slightly higher during the last six years than during the total period. These figures include only the immediate operative mortality, and not those who eventually died from ulcers not cured by surgery. Certainly this is a tremendous risk to take, in a disease which often gets well spontaneously, and whose mortality is, though doubtful, not large. Certainly operation should be limited to the most severe cases.

Closure of the pylorus has not improved end-results as expected, and has been abandoned by many surgeons. Crile,[2] and Jacobson and Murphy[3] report careful *x*-ray examinations of 17 cases after various stomach operations. They report that the gastro-enterostomy openings function equally well in the presence of an open or closed pylorus. Even if the pylorus is open, the bismuth passes out of the stomach through the stoma. The stoma, if properly made and placed near the pylorus, shows no tendency to heal if the pylorus is open. Excision of the ulcer, and plasties on the pylorus with excision, have proved to have seriously detrimental effects on the gastric motility.

Segmental resections do not have this effect, and may be of use in the future. Clinically our experience is too limited to judge as yet. Stewart and Barbour[4] have done some interesting research on this subject. Two series of dogs were operated on; in one, a triangular

piece of stomach was excised, and in the other a segmental resection performed. Tracings of the motility were made by means of a balloon inserted into the stomach. The former showed deficient and irregular peristalsis, and in the latter series it was very much like that of normal dogs.

Balfour[5] gives us a complete analysis of the 677 operations for gastric ulcer at the Mayo clinic during ten years. His conclusions are as follows: (1) For ulcers at the pylorus, posterior gastro-enterostomy is the operation of choice in the poor surgical risk, for though pylorectomy is followed by better results, the operative mortality is distinctly higher. The cautery is a useful adjunct in selected cases. (2) For ulcers on the lesser curvature, cautery by the method set out in a previous paper,[7] and gastro-enterostomy, is the operation of choice. (3) Local excision alone of such ulcers is inadequate: 32 per cent of patients so operated on ultimately required further operative treatment, viz., gastro-enterostomy. (4) Sleeve or segmental resection, especially in large high ulcers and hour-glass contraction in suitable cases, is not only a relatively safe operation, but has been followed by good results. (5) The lowest operative mortality in the more common operations was associated with cautery and posterior gastro-enterostomy. (6) Ulcers on the posterior wall are associated with the highest operative risk, while those at the pylorus are of least.

Scudder and Harvey,[6] experimenting on dogs with the cautery as advocated by Balfour,[7] report favourably on its use. Incisions made with the cautery have many advantages. Its cleanliness is obvious. Hæmostasis is perfect. The wound does not gape or stretch as a knife-cut does. Microscopic sections of cuts made with the cautery show that the injury to the tissues is very sharply limited, and that there is not a widespread heat necrosis as one might fear.

Richardson[8] has collected 104 cases of perforated gastric and duodenal ulcer operated at the Massachusetts General Hospital. The gastric cases had a mortality of 43 per cent, and the duodenal 24 per cent. Age was a great factor in the mortality, it being progressively higher each decade. Most noteworthy, however, is the fact that in the cases simply closed one-half were cured. The lesson of this is that gastro-enterostomy should not be performed at this time, especially as it carries an added risk.

Einhorn's[9] summing up of the status of surgery is conservative, and he especially emphasizes our duty to the patient to explain to him the doubtfulness of the outcome. "Regarding the surgical treatment, the following indications can be given: First, if you make the diagnosis of perforated ulcer of the stomach, duodenum, or other location of the digestive tract, the patient should be operated upon, and the quicker the better; second, in obstruction of the pylorus of a high degree the best results are by surgery; in the third place, acute hæmorrhage requires no surgery at the time of the bleeding. In recurrent hæmorrhages we can do a prophylactic operation in the interval to prevent renewal of hæmorrhage. In frequent small hæmorrhages,

surgery is indicated very often, but not always. Whenever we are in doubt whether or not there is malignant development, I usually advise operation in order to give the patient a chance of recovery in case the condition is malignant. These are, on the whole, the most typical indications for gastric surgery.

"There is also another possible situation in which operation is feasible, and that is when we do all we can, and cannot get rid of the pains which the patient suffers. We try one plan of treatment and another, and still the patient persists in showing unabated symptoms. Here again surgery can be resorted to. I cannot say that operation will free the patient of symptoms. I can advise trying it, although the results are not always successful."

REFERENCES.—[1]*Surg. Gyn. and Obst.* 1917, March, 350 ; [2]*Jour. Amer. Med. Assoc.* 1916, ii, 855 ; [3]*Ibid.* 1917, i, 112 ; [4]*Ann. Surg.* 1916, Nov., 527 ; [5]*Surg. Gyn. and Obst.* 1917, June, 731 ; [6]*Ibid.* 1916, Dec., 719 ; [7]*Ibid.* 1914, xix, 528 ; [8]*Boston Med. and Surg. Jour.* 1917, i, 150 ; [9]*N. Y. Med. Jour.* 1917, i, 193.

STOMATITIS, MERCURIAL. *W. H. Dolamore, M.R.C.S., L.D.S.*

Montgomery[1] quotes Almkvist's[2] explanation of this condition. When the proteid foods are pressed into the pockets about the teeth, or into the recesses of the mouth, they are attacked by the anaerobic putrefactive bacteria, principally the fusiform bacillus of Plaut-Vincent and the *Spirochæta dentium*. These bacteria form H_2S gas. Mercury is principally taken up by the blood, and so circulates in the capillary loops of the papillæ of the mucous membrane of the mouth. Here it comes in contact in the capillary wall with the sulphuretted hydrogen, causing a precipitate in these capillary walls of the black sulphide of mercury. This is only relatively insoluble, as it exerts a detrimental action upon the capillary loops, and interferes with the function of the vessels in transmitting nourishment, which, in its turn, bring about degeneration and molecular death of the superimposed epithelium. This epithelium constitutes additional dead proteid matter, furnishing still more nutriment to the anaerobic putrefactive bacteria, and so leading to erosions and ulcerations, abscess formation, periostitis, necrosis, and even the death of the patient.

As a prophylactic measure, tartar on the teeth should be removed, and decayed teeth filled or extracted. The teeth should be cleaned after every meal, using a tooth-powder, or paste, containing **Chlorate of Potash.** As a mouth-wash he recommends **Peroxide of Hydrogen** in weak solutions (a teaspoonful to half or a full glass of water) to be used three times a day. He regards this as almost a specific, both in preventing the condition and in curing the earlier stages. When the gums are more affected, undiluted peroxide of hydrogen may be directly applied, or equal parts of peroxide of hydrogen and a 20 per cent solution of **Nitrate of Silver.** The oxygen given off by chlorate of potash and by peroxide of hydrogen apparently interferes with the activity of the anaerobic bacteria. When erosions have formed, swab every two or three days with 10 per cent solution of chromic acid.

When it is necessary to stop the administration of the drug and

secure its speedy elimination, he doubts the wisdom of administering belladonna and atropine to control the tormenting salivation, since if these drugs are given to lower the activity of one set of glands, they just as surely lower activity in others, and therefore interfere with the intestinal, renal, and cutaneous elimination of mercury. Furthermore, the effect of these drugs on the salivary glands is apt to be very little, whereas their general effect on the entire secretory system may be quite pronounced, and therefore more harm than good may easily be accomplished by their employment. He states that there seems to be no doubt that the chief emunctory is the intestinal canal. Vogel and Lee recently found in cases of bichloride of mercury poisoning, that the mercury persisted longer in the fæces than in either stomach washings or in urine.[3] Hence he doubts the wisdom of prescribing opium with mercury as a routine practice in giving mercury by the mouth, with the double purpose of preventing a diarrhœa and of allowing the mercury to accumulate in the body. It is not the mercury that accumulates in the body that does the good; it is that which actively changes into a form noxious to the spirochæte and then passes through, carrying with it the peccant materials. The action is therefore spirochæticidal and eliminatory, and any interference with elimination is detrimental both in the treatment of syphilis and in any of the accidents produced by mercury.

References.—[1]*Med. Rec.* 1916, ii, 889; [2]*Dermatologische Zeitschrift*, 1916, Jan. and Feb.; [3]*Med. Rec.* 1916, Jan. 8.

SUTURES. *W. I. de C. Wheeler, F.R.C.S.I.*

The strength of catgut will not survive tension. It is obvious that if, say, a ventral hernia is closed with thirty-day catgut sutures, at the end of fifteen days it may break under the pull. Furthermore, catgut appears to absorb more rapidly under tension, and may not suffice to hold an abdominal wound for more than a few days when the case is complicated by distention, persistent vomiting, or coughing. Watson[1] discusses the sterilization of catgut sutures. He states that iodine has a detrimental action on suture material, but that, on the other hand, potassium mercuric iodide increases the tensile strength of the catgut strands. A 1–1000 solution of potassium mercuric iodide is superior in its germicidal action to a 1–100 solution of iodine. He recommends catgut to be prepared in a 1–1000 alcoholic solution of potassium mercuric iodide instead of the iodine solution ordinarily employed.

Reference.—[1]*Surg. Gyn. and Obst.* 1916, Jan. (abstr. in *Ther. Gaz.* 1916, May, 299).

SYMPATHECTOMY, PERI-ARTERIAL. *J. Ramsay Hunt, M.D.*

The term peri-arterial sympathectomy has been applied by Leriche and Heitz[1] to the Jaboulay method of denuding large arterial trunks of their encompassing sympathetic network. Denudation of the peri-arterial sympathetic of the femoral artery has had a favourable effect on the healing of intractable perforating ulcers of the foot.

Denudation of the cœliac artery has also had a favourable influence on certain obscure neuralgic pains of visceral origin. Of special interest is the favourable result obtained in cases of severe neuralgia of the median nerve by sympathetic denudation of the brachial artery. The authors have also applied this method in reflex paretic and spastic disturbance of the limbs associated with vasomotor and thermic manifestations without the reactions of degeneration.

Veyrassat and Schlesinger[2] also report favourably on this treatment in cases of perforated ulcer of the foot, causalgia, Raynaud's disease, and other painful affections of arterial origin. The benefit is probably derived from the stimulus imparted to the vasomotor fibres. The operative procedure is said to be harmless.

References.—[1]*Arch. des Mal. du Cœur*, Feb., x, No. 2, 79 (abstr. *Jour. Amer. Med. Assoc.* 1917, i, 1215); [2]*Jour. Amer. Med. Assoc.* 1917, i, 1214.

SYPHILIS.

C. F. Marshall, M.D., F.R.C.S.

Introduction.—The various substitutes for salvarsan have now had an extensive trial in Army medical practice, but there is not yet unanimity of opinion as to which is the best, nor as to the optimum number of injections. The immediate results are good on the whole, but 'relapses,' or rather the continued appearance of fresh symptoms, seem to occur not infrequently with all these preparations. As to the ultimate effects, these cannot be told at present, but it is not improbable that the stress and strain of active service in those who have been sent out a comparatively short time after rapid and intensive treatment may have deleterious effects, especially on the heart and arterial system.

In the diagnosis of syphilis *too much importance is attached to laboratory diagnosis, to the neglect of clinical practice.* A negative result in the examination of a chancre for spirochætes does not exclude syphilis as some would appear to believe, and the Wassermann reaction is sometimes negative when the clinical signs of secondary syphilis are obvious. Another point which does not seem to be sufficiently recognized is that the Wassermann reaction is influenced by the presence of mercury or arsenic in the system, so that an interval of three or four weeks should elapse between the cessation of treatment and the application of the test in order to allow time for elimination of these drugs.

Recently, the question of the prophylaxis of venereal diseases has been brought to the front, and the advisability of instructing the public in the use of measures, such as Metchnikoff's calomel ointment and various silver and other preparations, to prevent infection with syphilis and gonorrhœa, has been discussed. There is much to be said in favour of this, although it must be borne in mind that these prophylactic preparations are not infallible.

Diagnosis.—C. R. Ball[1] points out that the serobiological reactions must be regarded as symptoms rather than tests, and that the information obtained from them must be weighed in connection with all the

other data. When other symptoms fail they may give a clue; but, when absent, other symptoms must be depended on. He points out that the Wassermann reaction is negative in a large number of cases of syphilis, so that a negative reaction proves nothing for or against the presence of syphilis. He regards the examination of the spinal fluid by the globulin test and lymphocyte count as the surest test for the presence of latent syphilis, and the best criterion for deciding when to stop treatment. In syphilis of the nervous system without other symptoms, normal spinal fluid means a good prognosis; a pathological fluid, a latent affection which may at any time become active.

Nesfield[2] has investigated the relation of the Wassermann reaction to surface tension, and also the action of the alcohol in the alcoholic extracts used as antigens. He concludes that surface tension is the chief factor in the reaction, and that alcohol is the chief factor in the various antigens. Bile, carbolic acid, and solutions of cholesterin also act as antigens, and all these substances, though widely differing chemically, have the property of lowering the surface tension of serum.

Bergeron and Jouffray[3] remark that the failure of the Wassermann reaction to reveal all cases of syphilis, as proved by autopsy, renders it necessary to make the test more sensitive. Unfortunately, most of the modifications of the old technique are open to objections, and it is best to keep to the original. There is, however, an indirect means of rendering the reaction more sensitive, by reactivation. For this the authors prefer mercurial treatment, as the arsenical preparations are too active. The method they recommend is **Intramuscular Injections of Colloidal Mercury and Sulphur**—0·25 mgrm. sulphur and 1·0 mgrm. colloidal mercury. This is repeated in three days; then three injections of a double dose are given at intervals of three days. Fifteen days later a Wassermann test is done, and if positive the required result is obtained. If negative, the test is repeated in another fifteen days; sometimes the reaction is then positive. If still negative, it is repeated once a week till positive, up to six weeks. Beyond this time it is useless to repeat, and the diagnosis is still doubtful. This applies to cases of doubtful syphilis with a negative Wassermann and no previous treatment. In five cases of obvious syphilis with a feebly positive Wassermann, reactivation produced an ultra-positive result. A similar result was obtained in fifteen cases, including lesions of the liver, kidney, lung, heart, and vessels, hemiplegia, and chronic rheumatism, all of which gave a feebly positive Wassermann. In five cases with symptoms of syphilis (tabes, aortic disease, ulceration of the palate) and a negative Wassermann, a positive result was obtained after reactivation. In eleven other cases, including bronchiectasis, uterine tumour, chronic nephritis, persistent headache, rhinitis, and glaucoma, a positive Wassermann was obtained after reactivation. The authors therefore conclude that this procedure is useful in the diagnosis of doubtful cases. They also state that injections of colloidal mercury and sulphur constitute an active form of treatment.

McDonagh[4] regards the Wassermann reaction as a purely physical phenomenon ; that a positive reaction is only presumptive evidence of syphilis, and does not necessarily signify that the disease is active or that the patient requires treatment. He reminds us that the test is not specific, because the antigen need not come from a syphilitic source. He also states that a hæmolytic system can be prepared in which the amboceptor is not specific, and that aluminium hydroxide will serve as well. It is not necessary, therefore, to use rabbit's serum immunized against the red corpuscles of the sheep. He further says that a syphilitic serum can be differentiated from a normal serum by means of the ultra-microscope, because the colloidal particles of syphilitic serum are larger and more numerous than those of normal serum ; but owing to the expense, etc., of the ultra-microscope, he has attempted to evolve a simple test which will show the same points. According to McDonagh, if **Glacial Acetic Acid** is added to serum the particles become first converted into a state of gelation, then dissolved, and finally precipitated. These changes vary in degree according to the number and size of the particles, and are more rapid in syphilitic serum. Hence a syphilitic serum can be differentiated from a normal one by the rapidity of precipitation. For the details of this test the reader is referred to the original article.

Fletcher[5] finds that the **Luetin Test** is specific for syphilis, since it only gives a reaction in syphilitic cases. In a series of 130 cases (all Asiatics) of primary, secondary, and tertiary syphilis, positive reactions were obtained in 79 and negative in 51. The proportion of positive results was least in primary, greater in secondary, and greatest in tertiary syphilis. The most common form of reaction was the papular type. In this type, a small red papule appears on the third day ; this increases to the size of a small pea by the fifth or sixth day, and disappears at the end of the second week. In the pustular type a red areola appears round the papule, and the centre softens on the sixth day ; the pustule ruptures and soon dries up. The test is performed as follows : The skin of both forearms is rubbed with lysol ; injections are made intradermically by means of a tuberculin syringe with a small needle. About 0·07 c.c. of equal parts of **Luetin** and **Salt Solution** is injected into the left forearm, and the control emulsion into the right. The author concludes that the luetin test, when performed in conjunction with the Wassermann, is of great value. In the early stages of syphilis the Wassermann, and in the later stages the luetin reaction, is more constantly positive. In the great majority of cases one or other test is positive ; but even a negative result with both tests does not exclude syphilis.

Kolmar, Matsunami, and Broadwell[6] claim to have confirmed the results obtained by Sherrick,[7] who reported that a positive luetin reaction can be obtained in 99 per cent of all persons, irrespective of syphilis, by the administration of **Potassium Iodide**, either simultaneously with, or shortly before or after, the luetin injection ; also, that other substances, such as agar and starch, injected intradermally, will

give a similar reaction when potassium iodide is administered. The authors therefore conclude that the luetin test is of little value in the case of patients who are taking, or have recently taken, iodide of potassium. Cole and Paryzek[8] have obtained similar results. They conclude that some non-syphilitics give a positive luetin reaction, and that in non-syphilitics the reaction can generally be provoked by potassium iodide, and also to a lesser degree by other drugs, such as sodium bromide, calcium bromide, and potassium nitrate. Stokes[9] also states that he obtained reactions clinically similar to those of luetin by the intradermal injection of a solution of agar in physiological salt solution (0·5 to 0·7 per cent).

E. Corner[10] draws attention to the importance of sepsis as a complicating factor in the diagnosis of syphilitic chancre. He considers that the induration of the chancre is largely due to septic inflammation. An aseptic chancre may be nothing more than a granulating sore, slow to heal, with little or no induration, and only slight enlargement of the glands. Such chancres may be easily overlooked. Venereal diseases, he remarks, are the varying sum of mixed infections, and, according to the predominant factor of infection, they appear as syphilis, gonorrhœa, soft chancre, or phagedæna. The septic factor modifies the appearance of the predominant disease both clinically and pathologically. As regards diagnosis by the Wassermann test, he remarks that the same serum may be sent to different pathologists, and be reported positive by some and negative by others.

Fordyce[11] considers that examination of the cerebrospinal fluid is incomplete unless a **Colloidal Gold Test** (see MEDICAL ANNUAL, 1917, p. 503) is performed as well as a Wassermann test and cytological and chemical examination. The chief use of the gold test is in distinguishing true general paralysis from types of cerebrospinal syphilis which simulate it, and also in diagnosing early cases.

TREATMENT.—Fordyce[12] still holds that primary syphilis can be cured by **Salvarsan** alone when the Wassermann is negative; but as there may be dissemination of spirochætes even with a negative Wassermann test, it is better to give eight to ten injections of salvarsan and follow this with six months of **Mercury.** In secondary syphilis with a positive Wassermann, he recommends several injections of mercury, preferably soluble salts, previous to salvarsan. This is said to prevent Herxheimer's reaction. Fordyce gives five or six injections of salvarsan in doses of 0·3 to 0·5 grm. for men, and 0·25 to 0·4 grm. for women, at intervals of seven to ten days. Mercurial injections of soluble salts are given daily or every other day. He prefers **Perchloride of Mercury** in courses of twenty to thirty injections. Of the insoluble preparations of mercury he prefers **Grey Oil** (or mercurial cream) 1 gr. to 5 min., in series of ten to twelve weekly injections, or salicylate of mercury (40 per cent suspension) in doses of 1 to 3 gr. for ten to twelve injections. After a rest of six weeks this course of treatment is repeated. With visceral lesions salvarsan should be used in small doses, and in some conditions it is better to

precede it with **Mercury** and **Potassium Iodide.** In latent syphilis salvarsan often fails, and it is better to give mercury and potassium iodide. In cases where dermatitis is produced by salvarsan, this should not be repeated for six months or a year. According to Fordyce, the criterion of cure is a negative Wassermann for a year, continuing so after a provocative injection of salvarsan, and a normal cerebrospinal fluid.

Lloyd Jones and Gibson[13] report the results of 200 cases of syphilis treated according to the War Office scheme. This scheme (at the time this article was published) is as follows: First week, two injections of **Salvarsan** 0·3 grm., and one of **Mercurial Cream;** second week, one injection of salvarsan 0·3 grm., and one of mercury; third week, one of mercury; fourth week, one of salvarsan 0·4 grm., and one of mercury; fifth and sixth weeks, one of salvarsan 0·5 grm. and one of mercury; seventh week, one of salvarsan 0·5 grm., and two of mercury. In a large percentage of cases the clinical signs have disappeared and the Wassermann is negative after this course. If the Wassermann is still positive, **Potassium Iodide,** 30 gr. daily, is given for fourteen days. If still positive after this, three injections of mercury and a total of 1·2 grm. salvarsan are given during the eleventh to thirteenth weeks. In all the cases the diagnosis was based on the presence of the *S. pallida*, or by a positive Wassermann. None were treated on a purely clinical diagnosis unless the signs put the diagnosis beyond all doubt. The primary cases showed a much higher percentage of negative reactions after treatment than the secondary cases. The authors think it probable that some of the latter may show a negative reaction later, as the final blood tests were taken directly the course was finished (see introductory paragraphs, p. 528). The reaction was mild in about 50 per cent of the cases. Severe reactions included: (1) Cardiac, (2) Respiratory, (3) Central nervous symptoms, 0·53 each per cent of injections; (4) Rashes in 5·3 per cent; (5) Severe diarrhœa in 0·7 per cent; (6) Rigors in 9·9 per cent; (7) Immediate vomiting; and (8) Albuminuria (percentages not given). The cardiac symptoms included vascular dilatation, tachycardia, and bradycardia. Respiratory symptoms comprised dyspnœa and paroxysmal cough. Central nervous symptoms were rare—loss of consciousness, and in one case transient hemiplegia. Rashes consisted of transient erythema or urticaria, facial or labial herpes, and one case of acute exfoliative dermatitis. The authors are of opinion that the following factors are concerned in the causation of these symptoms: temperature of the solution and of the room, an alkaline reaction, injection of air into veins, the formation of small clots in the needle, a full stomach, water not freshly distilled. Local reactions, such as hæmatoma, lymphangitis, abscess, and necrosis, may be caused by faulty technique.

Trimble and Rothwell,[14] after a comparative study of **Salvarsan** and **Neosalvarsan,** conclude that the latter is superior, being easier of administration, less likely to produce severe reactions, and giving a

greater percentage of negative serum reactions. They find also that a series of injections of either of these drugs, even when followed by mercurial treatment, give a comparatively small percentage of negative serum results. These conclusions are based on the results of 110 cases, including primary, secondary, and tertiary syphilis. Salvarsan and neosalvarsan were given intravenously in dilute solution by gravity, at weekly intervals. The initial dose of salvarsan was 0·3 grm., and the subsequent ones 0·6 grm.; of neosalvarsan 0·45 and 0·9 grm. **Mercury** was not given till after the arsenical treatment; some by intramuscular injections of salicylate 1 to 2½ gr., others by oral administration of the perchloride, tertiary cases by **Mercury** and **Iodide.**

Favre and Massia[15] recommend the method of concentrated injections of **Arsenobenzol,** first advocated by Ravaut.[16] They use either neosalvarsan or novarsenobenzol-Billon dissolved in 2 c.c. only of distilled water or filtered boiled water. The advantage of this method is that it can be carried out with an ordinary syringe. No irritation of the walls of the veins is produced. General reactions were absent in most cases, slight in some. This absence of reaction is attributed partly to the concentration itself, partly to the association with mercurial treatment in the form of soluble salts, commenced before the arsenical injections and continued during them. The authors' conclusions are based on a series of more than 3000 injections.

Harrison, White and Mills[17] find that *subcutaneous* or *intramuscular injections* of **Neosalvarsan** have a better therapeutic effect than intravenous injections, and are naturally easier of technique. The newer preparations of salvarsan and neosalvarsan are more soluble than the older ones, and too quickly excreted to produce their full effect. The authors compared the results of two series of cases, one treated by intravenous injections of salvarsan or its substitutes, and another by subcutaneous or intramuscular injections of neosalvarsan or its substitutes. The first series included salvarsan, kharsivan, arsenobenzol, 'arsenobillon'; the second neosalvarsan, novarsenobenzol, and 'novarsenobillon.' As the results obtained by salvarsan and neosalvarsan agreed with those by each of the substitutes, they were combined in each series. In each series seven injections were given; in the intravenous salvarsan series on the first, fourth, eighth, twenty-second, twenty-ninth, forty-third, and fiftieth days, in doses of 0·3, 0·3, 0·3, 0·4, 0·5, 0·5, 0·5 grms.; in the subcutaneous neosalvarsan series on the first, eighth, fifteenth, twenty-second, twenty-ninth, thirty-sixth, and forty-third days, in doses of 0·6 grm. (0·45 grm. for the first two doses in some cases). In addition, seven injections of **Mercury** were given at weekly intervals. As it was impossible to observe the patients for prolonged periods, the results were based on a comparison of the Wassermann test. These results were in favour of the neosalvarsan subcutaneous series. The Wassermann reaction was more quickly influenced, and spirochætes disappeared from the lesions as rapidly after the first intramuscular as after the first intravenous

injection, in many cases in twenty-four hours. The blood was tested after the fourth injection and at the end of the course. Various attempts were made to reduce the pain of the injections; finally the method adopted consisted in the dose of neosalvarsan being dissolved in 1 c.c. of 4 per cent solution of stovaine and made up to 2 c.c. with creocamph cream melting at 15° C. The solution is made in the syringe, the creocamph is added, and the mixture well shaken. More recently the stovaine has been abandoned, and phenocamph has been tried with good results.

Bonard[18] reports the results of treatment by **Luargol,** a preparation of arsenobenzol combined with silver and antimony introduced by Danysz, of Paris, who found it more active than any other arsenical compound in trypanosomiasis. Bonard concludes that luargol is a step forward in the treatment of syphilis, since small non-toxic doses give satisfactory results. The doses given in primary, secondary, and tertiary syphilis were from 0·15 up to 0·30 grm., or a total of 1·5 grm. in six injections, given every second, third, or fourth day; in female patients from 0·1 to 0·25 grm. The drug was injected intravenously, either in dilute or concentrated solution. The contra-indications are few, as luargol is well tolerated; but in non-compensated heart lesions, acute meningitis, nephritis, etc., the doses should be small, 0·006 to 0·003 grm. In 100 cases the effect was more rapid than that obtained by the other arsenical preparations.

Ravaut[19] has summarized the results obtained by the various arsenical preparations in military hospitals in France during the last two years. The number of injections was over 93,000, and the preparations used were **Neosalvarsan, Novarsenobenzol, Salvarsan, Arsenobenzol, Galyl,** and **Luargol.** The dose given was usually 0·6 to 0·75 grm., occasionally 0·9 or 1·5 grm. All began with a small dose. Salvarsan and arsenobenzol were given diluted to 150 or 200 c.c. with saline solution; neosalvarsan and novarsenobenzol in concentrated solution, often as little as 1 to 2 c.c. Galyl and luargol were given in 5 to 20 c.c. Only one fatal case was reported (after novarsenobenzol). Among the serious reactions were one case of transient coma, one of delirium and epileptiform crisis (both after neosalvarsan), four of transient 'nitritoid' crisis (after galyl), two of meningeal irritation and two of facial paralysis (after neosalvarsan), two of epileptic crisis (neosalvarsan and galyl), one of acute dermatitis (after luargol). Preference is given to neosalvarsan and novarsenobenzol, as the technique of injection is simpler than that of salvarsan and arsenobenzol. Galyl is considered very active, but complaints are made of variations in manufacture and differences in solubility. Luargol is also said to be active.

McDonagh[20] recommends **Colloidal Iodine,** an emulsion colloid prepared in the Crookes laboratory. He finds that 300 c.c. can be injected intravenously with safety. It can also be injected intramuscularly, or given by the mouth. He states that it is more active than potassium iodide, and does not cause iodism.

McDonagh still claims good results from his preparations **Intramine** and **Ferrivine** (*see* MEDICAL ANNUAL, 1917, p. 511). He states that the new **Substitutes for Salvarsan** are even more toxic than the original German products, and mentions the following accidents occurring after their use which he has seen himself or had good evidence of: 6 cases of sudden death; 25 cases of arsenical dermatitis, 2 fatal; a fatal case of cerebral degeneration after an intraspinal injection of serum drawn off after galyl; 3 cases of tabes which were aggravated by intraspinal injections of serum after kharsivan and galyl; 5 cases of severe neurasthenia; 4 cases of arsenical neuritis; 7 cases of jaundice; an uncertain number of cases of shock.

Wile and Elliott[21] have conducted experiments to determine the manner of *absorption of mercury* in the method of inunction: whether this was by direct absorption through the skin or by volatilization through the lungs. For this purpose they compared volatile preparations, such as mercurial ointment and calomel, with non-volatile preparations, such as the red and yellow oxides, the oleate and salicylate. They find: (1) That mercury is absorbed in inunction both by direct absorption and by volatilization; (2) That non-volatile salts are absorbed by the skin, but more slowly: (3) That the more rapid appearance of mercury in the urine in the case of the volatile preparations is probably due to the combined action of both methods of absorption; (4) That mercurial ointment is the most rapidly absorbed, and should not be superseded by non-volatile salts, used for the sake of cleanliness: (5) That calomel, which is absorbed both by the skin and by volatilization, being a cleaner preparation, deserves a further trial as to its therapeutic effect. The mercury was tested in the urine by the cold modification of Reinsch's method.

Prophylactic Treatment.—Power[22] reports good results obtained in the Navy from the use of **Calomel Cream** 33 per cent, and **Nargol Jelly,** The latter is a combination of silver with nucleinic acid, and is injected into the meatus as a prophylactic against gonorrhœa. Both are issued to the men in collapsible tubes. By this means the incidence of venereal disease in the Navy is said to have considerably diminished.

On the use of **Mercurialized Serums** (p. 17); and of **X-rays** in syphilis of the stomach (p. 45).

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SYPHILIS OF THE NERVOUS SYSTEM. (*See also* GENERAL PARALYSIS.)

J. Ramsay Hunt, M.D.

John A. Fordyce,[1] in reviewing his experience with syphilis of the nervous system, states that the number of patients who show involvement of the spinal fluid in the secondary period of the disease bears a certain relation to the total percentage of cases with lues of the nervous system. In a series of cases of secondary syphilis examined two years ago, less than 20 per cent revealed abnormalities in the spinal fluid. Recently, another series of 63 cases were punctured; 25 per cent gave evidence of a definite pathological condition of the cerebrospinal axis, while 16 per cent showed trifling abnormalities. The significance of the latter cannot be definitely stated at the present time, but it may be assumed that they are only transient, and part of the systemic affection. Statistics in the literature, treating of abnormal fluids in the secondary stage of lues, are variously quoted as being from 10 to 90 per cent. In criticism of this disparity, it is possible that too much significance has been attached to minor changes, such as increased pressure, increase of a few cells, or a trace of globulin. The writer's belief is that only individuals who show very conspicuous changes, as evidenced by a definite cell-count, globulin, and positive Wassermann, are candidates for one or the other of the different clinical types of cerebrospinal syphilis, and that in a large majority of patients the spirochætæ must be destroyed spontaneously or by ordinary therapeutic agents.

Our greatest hope in the cure of syphilis of the nervous system lies in the adequate handling of the infection in its early inception. In other words, treatment must be prophylactic. If dermatologists and genito-urinary surgeons were familiar with the earlier manifestations of nerve involvement, they would uncover many cases of nervous syphilis against which a therapeutic attack could be made, rendering the patient secure from future degenerative changes.

It has been shown that in patients inadequately treated, a pleocytosis, marked increase of globulin, and a strongly positive Wassermann reaction may be present without evincing any subjective discomfort, the condition remaining latent for years, until symptoms of tabes or paresis make their appearance. When these cases are clinically developed, irreparable damage has already been done to the nerve tissue. It is therefore incumbent upon the syphilographer to treat the fresh infection energetically, and wherever practicable to examine the spinal fluid at the completion of the treatment, or, in absence of physical signs, after a provocative injection of salvarsan, which should be given one year after the Wassermann reaction has been continuously negative.

In patients with a negative blood and a positive fluid, a provocative injection of salvarsan should be administered, and the Wassermann reaction taken at stated intervals. If it remains negative, subarachnoid treatment may be begun at once. When both blood and fluid are positive, two or more injections of **Mercury** should precede the

intravenous administration of **Salvarsan,** and after two or three doses of the latter, the intraspinal injections instituted, supplemented by intravenous. In paresis, his usual practice is to begin intraspinal injections after the first intravenous treatment. Where subdural injections are well borne, they may be given in series of four to six, one to two weeks apart, with a rest period of four to six weeks, and then another course. Frequently tabetics are met with in whom intraspinal medication cannot be given oftener than once a month.

Since the introduction of the intraspinal method in 1912, he has treated 110 cases of tabes, 13 of taboparesis, 12 of optic atrophy, 25 of paresis, and 20 of other types of cerebrospinal syphilis by **Salvarsanized Serum.** At first the original method of Swift and Ellis, namely, the use of autosalvarsanized serum, was adhered to; for the past two years he has used Ogilvie's modification, with the direct addition of salvarsan to the blood-serum. The reasons for employing this technique instead of the autosalvarsanized serum recommended by Swift and Ellis are, first that a definite quantity of salvarsan can be introduced, and the dose more easily controlled; second, the possibility of the addition of a definite amount of the drug with a smaller quantity of serum; and, third, the possibility of preparing several doses with a blood serum removed from a single patient. The last is of decided advantage in treating a large number of hospital patients. Then, too, the intraspinal injections often have to be repeated more frequently than the intravenous, and in cases with a negative serum there is no indication for the latter. Experience has shown that the blood serum removed indifferently from patients acts equally as well as the autogenous serum. The most important step in the technique, besides absolute asepsis, is the use of a salvarsan solution which is nearly neutral. The blood is removed from an arm vein and centrifugalized, the serum is pipetted off, and then centrifugalized again to insure complete removal of any red cells. To 8 to 10 c.c. of this serum, $\frac{1}{20}$ to $\frac{1}{2}$ mgrm. of salvarsan, according to indications, is added. This mixture is incubated at 37° C. for forty minutes, and inactivated at 56° for one half-hour. There is apparently no limit to the number of injections that can be given. An activation of the lesions after the first injection is not a contraindication to the use of the drug, but calls for care.

The clinical results may be summarized as follows: In active progressive tabes the lancinating pains are ameliorated or disappear entirely. The gastric and rectal crises are usually controlled, or regress, and the ataxia is markedly decreased, and in some cases has disappeared. Disturbances of sensation partially or completely clear up. Sphincter control and sexual power have improved or returned to normal. The patients feel better, put on weight, and are able to resume their occupation. No return of absent reflexes was noted.

The results in optic atrophy depend upon whether the nerve substance is primarily affected, or whether there is an extension from

the meninges. In the former, treatment at first appears to be effective in arresting the process, but some cases slowly progress in spite of the apparent improvement. In the secondary form, energetic treatment is especially indicated, and gives a more encouraging prognosis.

Summarizing the cases of paresis, all showed the typical biological findings, namely, a positive serum, an increase of cells varying from 18 to 290, strongly positive globulin content, and a positive Wassermann in dilutions of 0·2 c.c. or less. The colloidal-gold test gave a typical paretic curve, that is, complete decolorization in the first four to eight tubes. The number of intraspinal injections varied from 6 to 41, alternating with intravenous injections of salvarsan.

In estimating the results obtained in the treatment of paresis, the benefit to be looked for depends on the duration and the anatomical involvement. In the type with the predominant changes in the meningo-vascular structures, with a high cell-count, a rather sudden onset, and marked mental disturbance, good results can be obtained and the process perhaps kept stationary. Where the parenchymatous tissue is chiefly involved, with atrophy or sclerosis, attended by a low lymphocytosis, and an insidious onset, the degenerative changes have probably advanced too far, and at most only temporary improvement can be expected, with almost certain relapse. No one can tell when paresis begins, and by the time it is clinically manifest the damage is irretrievable. Cases that respond to treatment, and those where therapy yields but indifferent or no results, give the same gold reaction with decolorization in the paretic zone. We have, therefore, in this test, not a means of distinguishing possible different types, but a method of separating true paresis from forms of meningo-vasculitis which simulate it.

The author concludes that in order to develop a successful plan of treatment in syphilis of the central nervous system it is necessary to have a clear idea of how infection takes place. In the secondary period of the disease, about 25 per cent show marked changes, while a less number reveal slight abnormalities in the spinal fluid. Therefore a certain percentage of such cases are cured spontaneously or during the general treatment of the disease. All patients at the end of the first year of their infection should be punctured, whether or not they have manifestations or positive signs of the disease. If the fluid remains negative to all the tests, they can be assured with a reasonable amount of certainty that they are not menaced by the possibility of a later development. Furthermore, a positive colloidal-gold test, with a persistent positive Wassermann in the high dilutions, points to an impending paresis, whether or not the patient shows mental impairment. In other words, years before the stigmata of degeneration appear, the pathological process is at work in the central nervous system.

Homer F. Swift,[2] one of the originators of the Swift-Ellis method, says that the best preventive is prophylaxis, but this problem is far

from solved. Next in importance is the proper treatment of syphilis in the early stages. No case should be released from treatment until the cerebrospinal fluid has been shown to be normal, in so far as pleocytosis and Wassermann reaction are concerned. Whether a slight excess of globulin is an indication for continuation of treatment, if all other abnormal elements are absent, is still an open question. In many patients with meningitis in the secondary period, followed for several years, the globulin is still in excess, although all other evidences of the disease have been absent for three or more years.

Even with the present diagnostic methods and several effective therapeutic agents, it is safe to say that a fair proportion of patients with syphilis are poorly treated, and probably a majority of them are released without lumbar punctures. The failure of many patients to be followed until cured is due to several causes: (1) The patients fail to realize the importance of proper treatment; (2) There is still a surprising lack of facilities in dispensaries for the proper treatment of syphilis; (3) Many physicians fail to realize the long systematic course that is required to eradicate the disease completely; (4) There are many cases of innocent syphilis, and syphilis with slight, or no, early manifestations, which go untreated and develop serious nervous lesions later.

From the standpoint of the prophylaxis of tabes or paresis, it is important to realize that they frequently develop slowly, and that signs or symptoms are often present for years before the disease is fully manifest. Lately more attention has been directed to the mono-symptomatic forms of syphilis of the central nervous system. Some authors claim that these forms are more frequent to-day than formerly, and that tabes is assuming a milder character; but it is more probable that their detection is due to refinement of diagnosis. While in fairly numerous cases the mono-symptomatic forms are reported to have remained free from further symptoms for many years in spite of lack of treatment, it is wiser to regard all such cases as being early forms of late serious disease.

In many cases the general administration of **Mercury, Iodides,** and **Salvarsan** affects favourably the course of syphilis of the cerebrospinal axis. This favourable influence is especially marked in the early forms of the disease. The tendency of cerebrospinal syphilis to relapse in spite of energetic mercurial and iodide treatment has long been noted by syphilographers and neurologists, and the failure of most cases of tabes to respond to the antiluetic treatment of the pre-salvarsan era made therapeutic nihilists of most neurologists.

The desirability of subarachnoid therapy has been well established. The problem was to find some beneficial therapeutic substance which could be repeatedly introduced without injury to the delicate nervous tissue, for only by repeated and prolonged treatment can we hope to arrest any form of cerebrospinal lues permanently. In previous years the uses of these various agents and the methods of

their administration have been reviewed (*see* MEDICAL ANNUAL, 1916. pp. 548, 554, 558, and 1917, p. 506). Suffice it to say that the preparations which have stood the test of time are: (1) **Autosalvarsanized Serum** obtained from patients shortly after intravenous injections of salvarsan: (2) **Serum** to which small quantities of **Salvarsan** have been added: (3) **Neosalvarsan** in small quantities and weak concentration; and (4) **Mercurialized Serum.**

The direct application of **Mercury** in the form of the albuminate, as devised by Byrnes, should theoretically be of value, and the reports seem to indicate that if the amount of mercury is kept under the irritating dose, beneficial results may be expected from its injection. It is well to call attention to the danger of repeated injections of **Mercurialized Horse Serum,** which may lead not only to a general anaphylactic state to horse serum, but may cause the meninges to become hypersensitive to the foreign protein, and repeated injections over a number of months may lead to a chronic meningitis similar to the condition we are trying to combat.

The injection of neosalvarsan in concentrated solutions, as recommended by Ravaut, or even in 1 per mille solutions, has been proved by numerous observers to be a dangerous procedure, since it is apt to be followed by various degrees of urinary retention and incontinence, rectal paralysis, paræsthesia of the legs, ataxia, and girdle sensations, and by paralysis of the lower extremities and death in severe cases. A given dose may be well tolerated several times, but later be followed by severe symptoms. Because of the uncertainty of unfavourable sequelæ, intraspinal injections of neosalvarsan should be given with extreme caution.

The addition of small quantities of salvarsan to serum, as recommended by Ogilvie, was devised to give a known amount of salvarsan instead of the uncertain amounts in the serum salvarsanized *in vivo*.

The use of the serum of patients withdrawn after intravenous salvarsan injections has been criticized chiefly because of the small amounts of salvarsan it contained. The writer has found that the majority of the sera, one hour after an intravenous injection, contained 0·01 mgrm. or more per c.c. When 12 to 20 c.c. of serum are used, each treatment represents the injection of from 0·12 to 0·2 mgrm. of salvarsan. It is unsafe to inject intraspinally more than a fraction of a mgrm. of either salvarsan or neosalvarsan.

Autosalvarsanized serum is definitely spirochæticidal: the salvarsan is present in a colloidal combination with the serum, which cannot be dialyzed through a celloidin membrane, as can salvarsan alone. Salvarsan in this colloidal state is probably more slowly diffused out of the cerebrospinal fluid, and hence is longer in contact with the syphilitic exudates. Moreover, it seems to the writer that some of the beneficial effect from serum injection may be due to the introduction of the serum *per se*, for he has had very interesting results from the intraspinal injection of non-salvarsanized serum in diminishing pleocytosis and the strength of the Wassermann reaction.

Technique.—In Swift's work at the Rockefeller Hospital, the blood was withdrawn one hour after intravenous treatment, and the serum diluted to 40 or 50 per cent with normal saline and injected in quantities of 30 to 40 c.c. It was thought that the dilute serum was less irritating; but for the past two years, at the Presbyterian Hospital, the patient was bled one half-hour after the intravenous treatment, and 15 c.c. of whole, heated serum injected without any more reaction than with the older method. Most of the patients now receive both the intravenous and intraspinal injections on the same day, and return to their usual occupations the following day. In this way a minimum of time is required.

The treatments seem to be better borne if not repeated oftener than once in two weeks. This is especially true in tabetics or patients with spinal syphilis. In paretics or patients with cerebral syphilis the intervals may be shorter. It is well to bear in mind that a certain amount of irritation always follows the introduction of any foreign substance into the subarachnoid space, and the effect of this should be allowed to disappear before the treatment is repeated.

One general principle which should always be considered is, that in any patient who shows evidence of involvement of the cerebral meninges or brain, salvarsan treatment should be preceded by a short course of mercury, to prevent the possible occurrence of a Herxheimer reaction in the region of vital nervous centres.

In the presence of a rapidly advancing case of tabes or of optic atrophy, where it is desirable to arrest the progress of the disease in an important organ, the institution of combined intravenous and intraspinal therapy at the beginning should be seriously considered, as rapidity of cure is the end to be accomplished.

Compared with the results in other forms of lues of the central nervous system, the treatment of paralytic dementia has been disappointing. It is true that most of the cases improve clinically, and in some of them there is a marked improvement in the condition of the spinal fluid. Still, with corresponding amounts of treatment, this response is much less marked than in tabes.

Wolfsohn[3] relates his experience with intraspinal injections of mercurialized serum in the treatment of syphilis of the central nervous system. The technique of administration of the serum is carried out according to Byrnes's original procedure. For one week the patient is given full doses of **Mercury,** preferably 1 drachm of the ointment inuncted every night. Forty c.c. of blood are collected in dry sterile centrifuge tubes. The blood is centrifuged immediately, and then placed in a refrigerator for eighteen to twenty-four hours, when it is again centrifuged for fifteen or twenty minutes, and 18 to 20 c.c. of serum are pipetted off. One c.c. of a solution of **Mercuric Chloride** in distilled water, which contains $\frac{1}{50}$ gr. of bichloride, is added to the serum. This prepared serum, which should be perfectly clear, is then heated at 56° C. (132° F.) for half an hour. A lumbar puncture is performed. Spinal fluid is removed until the pressure reads about

30 mm. The serum is slowly administered by gravity, at body temperature. The patient is placed in a bed, the foot of which is elevated eight inches, for four hours. Liquid diet is ordered. If necessary, **Morphine Sulphate** ($\frac{1}{4}$ gr.) is prescribed.

Twenty-five patients were treated by this method. On an average, five injections were given each patient. One to two weeks' interval elapsed, and all reaction had entirely subsided before a second injection was given in any case. With improved technique the reaction following the first injection is very slight, and consists usually of increase in the pain, slight dull headache, a temperature rising to 99° or 100°, and perhaps slight nausea, all of which disappear in eighteen to thirty hours, and are easily controlled by opiates. Subsequent injections cause little or no reaction. In the last hundred injections there has been practically no more reaction to the injection beyond that which would occur in any lavage of the subdural space. It is important to examine the urine for abnormalities before each treatment, as the presence of albuminuria is a distinct contra-indication.

In conclusion, he states that in 85 treatments by the formal Swift-Ellis method, he had been unable to obtain the same evidences of early improvement.

M. F. Lautman,[4] on the supposition that a soluble salt of mercury would be less irritating and possess better penetrating powers than an insoluble salt, has utilized the **Benzoate of Mercury** for intraspinal therapy. Mercuric benzoate is the mercuric salt of benzoic acid, readily soluble in normal saline in the quantities necessary for intradural administration, this solution being miscible in any proportion with blood serum without the formation of a precipitate.

Favourable results of intraspinal administration of **Salvarsan** in cerebrospinal syphilis and tabes have been reported by Stoner,[5] Gaines,[6] and Gordon.[7]

References.—[1]*Jour, Cutan, Dis.* 1916, 713; [2]*Amer. Jour. Med. Sci.* 1916, 490; [3]*Ibid.* 1917, 265; [4]*N. Y. Med. Jour.* 1916, 1281; [5]*Jour. Amer. Med. Assoc.* 1917, 610; [6]*Med. Rec.* 1917, 1034; [7]*N. Y. Med. Jour.* 1917, 873.

SYPHILIS OF THE STOMACH. (*See* Stomach, Syphilis of.)

TEETHING. (*See* Dentition, Disorders of.)

TEMPOROMANDIBULAR ARTICULATION, SURGERY OF.

J. S. Fraser, M.B., F.R.C.S.

L. W. Dean and W. F. Boiler[1] state that the proximity of the temporomandibular joint to the middle and external ear makes it of particular interest to the otologist. The fact that it is so frequently involved in diseases of the tonsils and peritonsillar structures and in dento-alveolitis makes it of great importance to the laryngologist. It is not unusual, in patients who come complaining of sore throat, for an *x*-ray picture of the temporomandibular joint to show a collection of fluid between the condyle and socket. This condition may be secondary to a throat lesion, or may result from a focus of infection

elsewhere. The patients usually refer the trouble to the ear, but this can be excluded by otoscopic examination.

Ankylosis of the lower-jaw joint may vary in degree. According to Blair, trauma is the most common single cause, and accounts for 50 per cent of cases, which were usually due to a blow or fall on the chin. Suppuration following scarlatina accounts for 20 per cent, and other cases are due to otitis media, dento-alveolar abscess, typhoid fever, pneumonia, measles, variola, diphtheria, and rheumatoid arthritis. Congenital ankylosis is very rare, and is due to trauma during delivery. The writers record three cases: (1) Bilateral complete bony ankylosis of congenital origin, cured by operation; (2) Fracture of the body of the mandible, in which a fairly good result was obtained; and (3) Bilateral forward dislocation of the lower jaw, cured by operation.

Reference.—[1]*Laryngoscope*, 1917, Feb., 65.

TETANUS. (*See also* Wounds and Wound Infections.)

Deputy Surg.-Gen. A. Gascoigne Wildey, R.N.

The administration of prophylactic injections of **Antitoxic Serum** at the earliest possible moment to the wounded in action has produced most satisfactory results. The steady decrease in the number of cases of tetanus in relation to the number of wounded, and the pronounced modification of the course of the disease, are apparent in all reports dealing with the subject. Bruce[1] has shown that the ratio of tetanus to the number wounded has fallen from 16 per 1000 in 1914 to 2 per 1000 at the present time. There is every reason to assume that antitetanic serum is the preponderating cause of this decrease. Other factors have been at work, and no doubt early operation and improved surgical methods claim a definite share in this improvement. The modification of the disease is profound; not only is the incubation period greatly prolonged by prophylactic measures, but in many cases the manifestations are local, producing a pathological condition new in man and resembling the local tetanus occurring in non-susceptible animals. The possibility of the incubation period being prolonged to weeks or even months calls for special attention, since the earliest signs of the disease developing—perhaps long after the healing of the wound—are more than likely to be overlooked or mistaken. Happily the rate of onset, as well as the disease, is modified, so that the slow development is favourable to successful treatment. At the same time the chances of success diminish rapidly with delay, so that it is of the highest importance to recognize the earliest symptoms.

Modified tetanus is described as occurring in three distinct forms:[2] (1) Splanchnic tetanus; (2) Cephalic tetanus; (3) Local tetanus of the limbs. In these forms of local tetanus general spasms with opisthotonos are absent.

1. *Splanchnic Tetanus* follows upon penetrating wounds of the abdomen and thorax. It is said to be nearly always fatal within

forty-eight hours of its onset. The spasms are limited to the muscles of deglutition and respiration, and resemble those of hydrophobia.

2. *Cephalic Tetanus.*—The varieties described are: (*a*) Non-paralytic; (*b*) A form accompanied by facial paralysis; (3) Oculomotor paralysis; (*d*) Paralysis of the hypoglossal nerve. The form with facial paralysis follows wounds of the face. The paralysis is limited to the same side as the wound; there is dysphagia and trismus, spasms occurring in the apparently paralyzed muscles.

3. *Local Tetanus of the Limbs.*—In this the chief symptoms are clonic and tonic spasms of the muscle groups in the neighbourhood of the wound. The earliest signs are general restlessness, an anxious look, difficulty in micturition, outbursts of temper, sleeplessness, headache, excessive yawning, and profuse sweating. Sooner or later local symptoms develop. The muscles in the immediate vicinity of the wound twitch or show irregular clonic contractions. A slight tap increases the violence of the contractions, which may spread to adjacent groups of muscles, or there may be contractions, usually of a group of flexor muscles near the wound. Pain and stiffness are complained of in one or more limbs—symptoms frequently mistaken for rheumatism. These conditions may remain localized for days or weeks. If not controlled by treatment, the disease may become generalized; groups of muscles far removed from the site of the wound becoming affected, the most certain initial symptom being trismus. Stiffness of the cervical muscles is a common early sign. The pulse-rate is rapid, while the temperature may be normal. The tetanic rigidity may be mistaken for hysterical spasm.

Burrows[3] notes that the spasticity does not pass off during sleep. He calls attention to a special reflex indicative of tetanus. This consists of extension of the foot and leg when the sole is stimulated, and is in contrast with the normal reflex, which is a withdrawal of the foot. He believes that respiration of automatic type may be the first positively recognizable evidence of the onset of tetanus. With the generalization of the disease the reflexes of the lower limbs are often exaggerated, with, perhaps, a crossed response. Ankle-clonus is sometimes present. In advanced cases definite opisthotonos is observed, and there is rigidity of the abdominal walls. Tetanus may be said to be generalized when spasticity or rigidity occurs in muscles distant from the wound; the toxin has then entered the blood-stream and reached all parts of the nervous system.

Montais[4] describes four degrees of modified tetanus: (1) A strictly local form which occurs usually within the first month after the anti-toxin injection, the higher centres being still protected by the prophylactic dose. (2) A form, local at first, but showing later on mild symptoms of generalization. (3) Cases commencing at once as general tetanus, but after an incubation of over one month. The symptoms are somewhat less severe than in the unprotected. Spasticity shows a tendency to persist. (4) Cases showing no evidence of protection, the disease following the ordinary type.

It is generally believed that in man when no prophylactic has been given, the toxin, developing at the site of injury and acting on the central nervous system both by way of absorption into the general circulation and by way of the motor nerves to the spinal centres, produces general tetanus, since the higher centres in the pons and medulla, being unprotected and highly susceptible, are open to immediate attack from the blood-stream. When antitoxin has been injected early, its presence in the blood protects—so long as its effects are lasting—the higher nerve centres, but does not always prevent the direct infection of the spinal centres by the motor-nerve route through the terminals in the muscles involved in the wound. Hence the manifestations of only local symptoms of the disease in protected man. Bruce, in his analysis of cases of tetanus treated in the home hospitals during the period October to December, 1916, gives the rate of mortality in generalized tetanus as 34·4 per cent, and in localized tetanus 0·0 per cent. This, in comparison with previous reports, shows a steady decline in the death-rate. When symptoms develop within ten days the rate of mortality is much higher; when they are delayed beyond twenty-five days there is a very pronounced fall. The severity of the disease is usually directly proportional to that of the wound, gas-gangrene, severe sepsis, compound fractures, and multiple wounds being very fatal complications. Observers differ as to whether a fatal issue is more common in body wounds or in wounds of the limbs.

In modified tetanus the disease appears to develop most frequently between the 11th and 13th day after injury. The range is from two to 365 days. Bruce notes that of forty-two cases inoculated on the day of the wound, the average incubation period was 48 days. It is generally held that the antitoxin disappears from the blood in about ten days. The Committee of the War Office for the Study of Tetanus recommend that the injection should be repeated at intervals of a week up to four doses, in all cases of long-continued septic wounds. These injections will not destroy the tetanus bacilli in the wound, but by neutralizing the toxin they limit the disease to the local form.

Prophylactic Treatment.—**Prophylactic Injections** should be given as soon as possible after injury. On the authority of the Tetanus Committee the danger of anaphylactic shock is negligible when doses of 500 U.S.A. units contained in 3 c.c. of horse serum are given subcutaneously, whatever be the interval after the preceding injection. The ordinary vial contains 1500 units. More than 500 units may be injected when the condition of the wound suggests extra precaution. It is necessary to guard against the danger of a secondary operation at the site of a wound lighting up a latent tetanus infection even when the wound has been healed for many months. A prophylactic injection should be given two days before the operation, since it takes forty-eight hours for the antitoxin to be absorbed when administered subcutaneously. By the intramuscular route absorption is less slow. Bruce advises the preventive dose given before

secondary operation should be by the combined subcutaneous and intramuscular channels, inoculating it at several points around the site of the operation and at different depths of muscle on its proximal side. He suggests 1500 units as a suitable amount.

Therapeutic Treatment.—When the disease is threatened or established, **Antitetanic Serum** can be given by six routes, i.e., intracerebral, intraneural, subcutaneous, intramuscular, intravenous, and intrathecal. The intracerebral and intraneural routes are rarely employed except in desperate cases. Leishman[5] places the alternative channels of administration in the following order of merit: intramuscular, subcutaneous, intrathecal, intravenous. He is in full agreement with the Tetanus Committee that the intravenous route should not be used. In his experience it is of little use, and the risk of anaphylaxis is great. He is not in favour of the intrathecal method, believing it to be dangerous and based on unsound ideas. If it is chosen, he thinks it undesirable to withdraw more than 10 to 15 c.c. of cerebrospinal fluid, or to replace this by a greater volume of antitoxin. Others recommend the withdrawal of 20 c. c., and the same quantity of antitoxin very slowly injected. The **High-potency Serum** with about 800 units to the c.c. is considered preferable for intrathecal injections. Most English writers recommend the intrathecal route, either combined with the intramuscular and subcutaneous routes, or alone, whenever trismus is present. Andrews[6] quotes the results of Sherrington's experiments upon monkeys. "Of 10 untreated control monkeys all died. Of those treated with antitoxin subcutaneously all died. Of 12 treated by intramuscular injection all died. Of 16 treated by intravenous injection 10 died (62·5 per cent mortality). Of 18 treated by intrathecal injection 5 died (27·7 per cent mortality)

Dean[7] thinks the danger of intravenous injections is exaggerated. The essential principle in treatment by this method is to give a very large dose at the earliest possible moment; 30,000 U.S.A. units and over are given under chloroform anæsthesia. Anaphylaxis is guarded against by the following procedure: 5 c.c. of antitoxin serum are diluted with 50 c.c. of normal saline; of the mixture, 1 c.c. is injected intravenously; after four minutes a further 3 c.c., two minutes later 10 c.c., and after another two minutes 25 c.c. Half an hour later the full quantity of serum desired is given, supplemented by doses administered intrathecally and intramuscularly. There is a general agreement that large doses are necessary in the therapeutic treatment by serum. In very mild cases of local tetanus, one dose of 10,000 units given intramuscularly, followed by smaller doses at intervals of two or three days, may suffice; but in generalized tetanus the number of units given daily by combined methods may greatly exceed 10,000.

Worster-Drought,[8] reporting a severe case successfully treated with repeated injections of antitoxin, gives the following interesting analysis of the treatment: *Intrathecal*—first to eleventh days inclusive, 8000 units per day=88,000; thirteenth, fifteenth, seventeenth,

and nineteenth days, 8000 units per day=32,000. *Intravenous*—first day, 12,000 units, second day 10,000 units=22,000. *Intramuscular*—first day, 4000. Total, 146,000 units.

Other Therapeutic Remedies.—Carbolic and magnesium sulphate injections are not reported on favourably. Their effects are described as transitory and without curative action. Of the sedative drugs, **Morphine** in $\frac{1}{4}$-gr. doses every four hours is recommended as the most suitable. **Chloral, Chloretone,** and other sedatives are given by the mouth or rectum. **Hyoscine** injections ($\frac{1}{100}$ gr.) have been employed when the patient is unable to swallow.

Surgical interference with the wound when symptoms of tetanus are present is very generally condemned.

References.—[1]*Lancet*, 1917, ii. 411; [2]*Surg. Gyn. and Obst.* 1917, i. 166 (abstract); [3]*Lancet*, 1917, i, 139; [4]*Surg. Gyn. and Obst.* 1917, i, 156 (abstract); [5]*Lancet*, 1917, i, 131; [6]*Ibid.* 682; [7]*Ibid.* 673; [8]*Pract.* 1917, Feb., 182.

W. I. de C. Wheeler, F.R.C.S.I.

Kümmell[1] states that the mortality in cases of tetanus in the war has fallen slowly from 100 to 50 per cent. This remarkable result he attributes entirely to preventive inoculation. In 1555 cases inoculated, only one developed tetanus. On the other hand, queries directed to colleagues who did not practise immunization show in a relatively small material a large proportion of cases. Everything points to the truth of the claim that war tetanus is preventable. The *Medical Record*[2] points out that little can be expected from the use of the serum in those persons who are so susceptible that the toxin is absorbed with exceeding rapidity. The occurrence of serum sickness is of relatively little importance, while serious anaphylaxis is quite rare. The same journal[3] discusses **Magnesium Sulphate** in the treatment of tetanus. It may be given by intraspinal, subcutaneous, or intravenous injection. The drug was used years ago by Kocher, but its value is deprecated by the War Office Tetanus Committee.

Browning[4] suggests that when the case is very severe, involving the diaphragm and larynx, an intraspinal injection of magnesium sulphate produces rapid and prolonged relaxation which sets in in half an hour and lasts twenty-four hours. The dose is 1 c.c. of a 25 per cent solution per ten kilos of body weight, introduced under ether anæsthesia. The patient should be kept in the horizontal position, with the head alone raised. Subcutaneously 1 c.c. to 2 c.c. of a 25 per cent solution for each kilo body weight may be administered for milder cases under light anæsthesia.

Tullidge[5] discusses the question of tetanus, and states that a typical case as presented on the Austro-Russian front manifests the following symptoms: Aches and pains in the muscles, with general lassitude. Headache, with gradual stiffening of the muscles of the back of the neck, face, and jaw. The patient may complain of marked constipation and retention of urine with a frequent desire to urinate. Such prodromal symptoms may last with alternating intensity for some days, or even weeks, and, when they develop or exist along with a

severe lacerated wound, tetanus may be expected in nearly every case. The toxins of the bacilli ascend the motor nerve sheath and thus reach the spinal cord, there uniting with the nervous tissue to remain in a more or less fixed combination that resists the antitoxic serum. Very large doses of serum in such cases are conducive to good effects, while in cases exhibiting a longer period of incubation, smaller doses result in a larger percentage of recoveries. **Chloral Hydrate** in doses of 5 to 10 gr. is the recognized remedy to control convulsions and spasms. **Hyoscine Hydrobromide** $\frac{1}{100}$ gr. has also been proved of great value.

Burnett and Tulloch[6] refer to tetanus localized to one limb, and attribute the condition to raising the resistance of the patient by prophylactic administrations of antitoxin. The central nerve system as a whole is immunized, but insufficient to prevent intoxication at the point where the toxin enters the cord. In reference to a case of a paraplegic type, these writers say: "It is as though the cells of the left lumbar enlargement were exposed to a greater concentration of toxin than the rest of the cord, and therefore showed evidence of intoxication, while the naturally more susceptible areas did not suffer, being less directly exposed to the influence of the toxin." One would expect a local tetanus to be a notable feature at the onset of the disease; but it is not. Certain areas of the central nervous system—the cranial nuclei—exhibit a special susceptibility to tetanus, and this peculiarity determines the early onset of trismus as well as the absence of premonitary local spasms. It is reasonable to suppose that a man may be so immunized against tetanus that only the portions of the cord in nearest communication by nerve trunks with the wound is affected. In this way cases of localized tetanus may be explained.

The War Office Committee on Tetanus lays down that every wounded man should, as soon as possible, receive 500 U.S.A. units of the serum, or one-third of the contents of an ordinary phial. Two or three similar injections should be given, one each week, according to the nature of the wound. For the curative treatment of tetanus the Committee recommends the following dosage:—

Day	Subcutaneous	Intramuscular	Intrathecal
1st day	—	8,000	16,000
2nd day	—	8,000	16,000
3rd day	—	4,000	8,000
4th day	—	4,000	8,000
5th day	2,000	—	—
7th day	2,000	—	—
9th day	2,000	—	—

REFERENCES.—[1]*Berl. klin. Woch.* 1916, April 17 (quoted in *Med. Rec.* 1916, i, 925); [2]*Med. Rec.* 1916, 914; [3]*Ibid.* 1002; [4]*Brit. Jour. Surg.* 1916, July, 14; [5]*N. Y. Med. Jour.* 1916, i, 1018; [6]*Brit. Jour. Surg.* 1916, July, 43.

THERMOMETERS, STERILIZATION OF.

Herbert French, M.D., F.R.C.P.

Ramsey and Schoberg[1] took 82 cultures from thermometers used by physicians in their daily practice and carried in the ordinary case in the pocket: 33 were sterile, and 49 contained organisms of various kinds. Streptococci were present in 13, *Staphylococcus albus* and *citreus* in 13, pneumococcus in 1. Ordinary washing with 95 per cent alcohol will not render a clinical thermometer free from secretion after using. It was found that thorough washing with running water and rubbing, then rubbing off with sterile cotton wet with 95 per cent alcohol, was efficient. Washing with soap and water followed by drying on a clean towel did not sterilize. It is suggested that thermometer cases should contain some antiseptic such as formaldehyde or alcohol.

REFERENCE.—[1]*Ther. Gaz.* 1916, Dec., 906.

THORACIC WOUNDS. (*See* CHEST, WOUNDS OF.)

THROAT AFFECTIONS, INTERNAL SECRETIONS IN. (*See* INTERNAL SECRETIONS.)

THROMBO-ANGIITIS OBLITERANS. *C. F. Coombs, M.D., F.R.C.P.*

ETIOLOGY.—This disease, though fortunately unfamiliar to British clinicians, has nevertheless been studied in London by Parkes Weber and others. Most of our knowledge we owe to Buerger and other American workers. Generally regarded by them as being almost exclusively confined to the poor Jewish immigrants of their great cities, it is nevertheless found also in the countries of Central and South-Eastern Europe, where an identical, or at all events closely similar, type of gangrene of the extremities appears to have been specially prevalent during the war. Cases of the same kind were seen by various observers during the two Balkan wars. Goodman[1] argues a common etiology for all these lesions, and explains them as due to an obliterative inflammation of the blood-vessels set up by the virus of typhus fever. He bases this theory on histological and serological evidence.

TREATMENT.—Sinkowitz and Gottlieb[2] have sought for some method of treatment whereby amputation, usually regarded as inevitable sooner or later in these cases, may be avoided, or at all events postponed. As they observe, study of the vascular changes in the amputated limbs proves a tendency to self-cure by the establishment of a new circulation, either through collateral anastomoses or by the canalization and vascularization of the thrombosed main blood-vessels. After examination of the various conservative methods already in use, they decide in favour of **Passive Hyperæmia** by the Bier suction method. From observation of twenty cases so treated they conclude that this plan gives results unsurpassed by any other method available. Some cases, as they found, are of course too

advanced to respond to this plan, but in the vast majority an obvious improvement was achieved. The apparatus used was "an ordinary Bier's suction cylinder, large enough to enclose the front part of the foot. The rubber cuff attached to the open end of the cylinder fits snugly round the ankle. The air is exhausted by a hand-pump attached to a small opening at the closed end of the cylinder." The application is made for five to fifteen minutes three times a week, till improvement is definite and maintained.

References.—[1]*Med. Rec.* 1917, ii, 275; [2]*Jour. Amer. Med. Assoc.* 1917, i, 961.

THYMUS GLAND, HYPERTROPHY OF. *J. S. Fraser, M.B., F.R.C.S.*

Cumston[1] considers the clinical evidence met with in hypertrophy of the thymus is of two orders: (1) The functional symptoms, characterized by respiratory disturbances which attract attention: and (2) Physical signs, which must be carefully searched for.

Symptoms.—The inspiratory effort in hypertrophy of the thymus is not that of croup. With each inspiration there is a forward projection of the sternum, a decrease in the transverse diameter of the thorax, and a spreading of its lower circumference. This deformity may become permanent. Paroxysms of suffocation arise in most cases—usually at night—causing some cyanosis, which is relieved by the sitting position. Spasm of the glottis and stridulous laryngitis may occur. Some hold that the stridor is due to compression caused by the hypertrophy of the thymus gland, while others maintain that it is owing to malformation of the larynx. It would appear that there are two clinical types of stridor:—(*a*) laryngeal stridor without any paroxysms of suffocation, and (*b*) thymic stridor with serious paroxysms. The facies is often peculiar; cyanosis is intense at the time of the paroxysm, and may remain during the remissions. The superficial veins of the neck are distended during the paroxysms, and also when the child cries.

Physical Signs.—Palpation often reveals a forward vaulting of the manubrium sterni. To perceive this the infant should be laid flat on the bed, and the parts inspected with the light coming from behind the examiner. Percussion should be made over the upper limits of the sterno-costal area, just under the clavicles. An area of dullness of several centimetres will be found. Retrosternal pressure is carried out as follows: The child is seated with the head in semi-extension, and the pulp of the index finger is placed over the supra-sternal fossa so that it can become engaged behind the manubrium. On applying pressure the stridor ceases, only to begin again as soon as the pressure is removed. Radiography has been employed in diagnosis, but the interpretation of the radiogram is by no means easy. This method, however, may be useful, because it may eliminate enlarged tracheo-bronchial glands from the diagnosis (p. 47).

Treatment.—Intubation with a long tube has given some results,

but is absolutely useless in thymic asphyxia. The same may be said of tracheotomy, because the obstacle is too low down. The only rational treatment is surgical interference. Three distinct methods have been tried, viz., **Thymopexy, Resection of the Manubrium,** and **Thymectomy.** It is probably more difficult to fix an enlarged thymus to the incision (thymopexy) than to excise it. Resection of the manubrium has never been employed alone, and has always been a step in the partial resection of the gland. Resection of the manubrium is a useless and insufficient procedure. Thymectomy by intracapsular enucleation is the operation of choice. Any attempt to remove the gland with its capsule results in severe loss of blood, and entails the risk of injury to the pleura, pericardium, and large vessels. Partial subcapsular thymectomy offers the best chance of success with comparatively little risk. When only a very small fragment of the gland has been removed, the symptoms have subsided. Cumston states that we have not had sufficient experience of radiotherapy in these cases to enable us to speak positively as to its utility.

REFERENCE.—[1]*Med. Press and Circ.* 1917, Aug. 22, 140.

THYROID, DISEASES OF. (*See* GOITRE.)

TINEA BARBÆ. *E. Graham Little, M.D., F.R.C.P.*

Engman and McGarry[1] report two cases of this obstinate disease cured by the administration of **Vaccine** prepared by Strickler on the principles laid down in his paper noted in the MEDICAL ANNUAL for 1916, p. 501. Both cases were of the large-spored endothrix type. Nothing was applied locally except **Vaseline.** Both patients remained in hospital throughout treatment. Injections were made into the skin between the scapulæ, at intervals of six days, the dose apparently having been 2 c.c. at each injection. In the first case there was an intercurrent complication of cholecystitis, but with this exception there were no adverse symptoms, and after six injections the condition was cured. In the second case, with the same dose, after only three injections the cure was complete.

Levin[2] suggests that the term 'barber's itch' should be either discarded or restricted to the sycosis caused by the presence of the fungus of ringworm, *Tinea sycosis.* He presents elaborate tables of differences which distinguish this affection from coccogenic sycosis, impetigo contagiosa, eczema, acne, tubercular syphilides, seborrhœa, furunculosis, carbuncle, pustular syphiloderms, and blastomycosis; but the demonstration of the fungus which is the sole unassailable criterion of tinea sycosis renders other differentiations of much less importance. He recommends the following line of treatment. The patient should shave daily in order to remove mechanically numerous fungi and prepare a clear field for the applications. Twice daily the affected areas should be washed with soap and water to remove débris and fungi and to prevent the spread of the infection. Precautions should be taken to keep the adjacent normal areas clean and free

from contamination. Ointments are then thoroughly massaged into the lesions, e.g. :—

(1)

℞	Iodine Crystals	℥j	Goose Grease	q.s. ad. ℥j

or (2)

℞	Sulphur Ointment Red Oxide of Mere. Oint.	℥iij ℥iss	Zinc Oxide Ointment	q.s. ad ℥j

Another method of treatment, productive of good results, consists in the application of wet dressings of a 1–2500 solution of **Bichloride of Mercury** when the patient is indoors ; and the rubbing in of a 5 per cent **White Precipitate of Mercury** ointment previous to going outdoors and at bedtime. In obstinate cases the **X Rays** or **Cataphoresis** with a 1 to 2 per cent **Aqueous Iodine Solution** is used.

References.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 543 ; [2]*Med. Rec.* 1917, i, 328.

TONSILS, DISEASES OF. *J. S. Fraser, M.B., F.R.C.S.*

Beck[1] believes that foci of infection are more frequently found in the tonsils than in all other organs. A septic tonsil may be normal in size or even atrophied, and yet prove to be the seat of retention. The most common constitutional symptom of focal infection is indisposition or malaise, often to the extent of great fatigue, due apparently to toxic absorption. Such patients experience complete relief from removal of the tonsils.

Wood has found that organisms may gain entrance to the parenchyma of the tonsil by passing through the unaltered epithelium of the crypts. According to Crowe, Watkins, and Rothholtz,[2] it is probable that acute tonsillitis usually begins as a focal abscess or abscesses in partially obstructed crypts. It may often be aborted during the early stage by irrigation of the infected crypts with sterile salt solution. These writers also hold that during the early stage of an acute tonsillitis there is a general bacteriæmia. If the organism be of low virulence, or if there be a sufficient degree of immunity, it is quickly killed off. If, on the other hand, the organism is one of the streptococci, especially the *Streptococcus viridans*, metastatic infections may occur. Pneumococci and other pyogenic cocci may also give rise to endocarditis. Patients with tonsils that have been damaged by previous infections or partial operative procedures (tonsillotomy) are more likely to have some general disorder as the result of acute tonsillitis than those with a first infection of previously normal tonsils. The writers regard *enlargement of the neighbouring lymph glands as one of the most important points in determining whether there is a chronic infection of the tonsil.* It is probable that the joint, renal, muscular, and valvular lesions secondary to a focal infection are due to infected thrombi. Crowe, Watkins, and Rothholtz found that joint or peri-articular suppuration occurs in about 50 per cent of animals injected with streptococci obtained from a scarlatinal sore throat or an accessory-nasal-sinus infection.

Primary Tuberculosis of Faucial Tonsils.—Mitchell[3] has conducted an extensive investigation into the subject of tuberculous disease of the faucial tonsils and cervical glands. He comes to the following conclusions: (1) Tuberculosis of the upper deep cervical glands develops from a primary focus in the faucial tonsils much more frequently than is generally supposed. (2) Primary tuberculosis of the faucial tonsils can be recognized only by the aid of the microscope and by inoculation experiments. The lesions are found in certain localities, namely, immediately under the surface epithelium and near the mouth of the lacunæ, in relation to the deeper portions of crypts, or deep in the tonsil close to the capsule. The first-mentioned site supplied the greatest number of examples. (3) Hypertrophied faucial tonsils may be the seat of primary tuberculosis, though rarely as compared with tonsils from cases of tuberculous cervical adenitis. (4) The experimental results indicate that in Scotland, at any rate, primary tuberculosis of the faucial tonsils in children must be attributed to the drinking of milk from tuberculous cows, rather than to the inhalation of human tubercle bacilli conveyed by dried sputum or to the moist spray from the coughing of a consumptive patient. (5) Bovine and human types of the bacilli are present in the tonsillar crypts of a small percentage of children without demonstrable tuberculous lesions either in the tonsils or elsewhere. (6) **Tonsillectomy** is essential in all cases of tuberculous cervical adenitis in children. (7) The prognosis is very slightly influenced in children in whom the faucial tonsils and cervical glands are simultaneously affected with tuberculosis. (8) The difficulties associated with the reform of the milk supply, and the lengthened period which must elapse before it becomes possible to obtain a tubercle-free milk, demand some means of rendering milk safe. The only immediate safeguard is to be had in the sterilization by boiling of milk for the artificial feeding of infants and the nourishment of all children.

Indications for Operation.—Layton[4] holds that, before advising operation, we must eliminate two fallacies—(1) We must not come to a conclusion just after an acute attack of coryza or tonsillitis: (2) We must remove any other source of septic infection in the mouth. Layton found that many tonsil cases which had to wait a considerable time before operation did not require interference when they were admitted. In the interval they had had their teeth attended to and had been taught breathing exercises.

Platte[5] remarks that hypertrophy of the tonsil is a purely relative term, for there is no sharp dividing line between normal and hypertrophied tonsils. In the child, hypertrophy may be only a physiological process, whereas in the adult it is due to connective-tissue proliferation and is pathological. Tonsils may be very misleading in appearance. The buried tonsil (a large tonsil in a deep sinus) is the largest type of tonsil, and yet may not show itself beyond the pillars. A small tonsil in a shallow sinus, on the other hand, may appear very prominent. Hence prominence and hypertrophy are not neces-

sarily synonymous terms. Tonsils pronounced large before operation, because they are prominent, are often found to be smaller when removed than buried tonsils which, on account of their submerged condition, did not attract attention. The very worst conditions as regards retention may exist in the small buried tonsil.

The simplest indication for the removal of tonsils is given by Perry,[6] who advises tonsillectomy as a prophylactic measure in all children of four years!

Ballantyne and Cornell[7] reports six cases in which the tonsils were enucleated from diphtheria carriers by the dissection method. In all cases three successive negative swabs were obtained after operation with the healing of the wound, although saline irrigations and gargles had previously been used before operation without success. In four of the six cases, diphtheria bacilli were found in the depths of the crypts after removal.

Contra-indications to Operation.—(1) The tonsils should not be removed during an attack of acute tonsillitis. Cases have been reported in which a cerebral abscess followed a tonsillectomy while the tonsils were inflamed; (2) M'Kenzie[8] states that in acute middle-ear suppuration we should not operate on the throat till the acute symptoms have subsided: (3) Rheumatoid arthritis; (4) The acute stage of chorea, rheumatic fever, or endocarditis; (5) Pulmonary tuberculosis; (6) Tonsillectomy should not be performed on any patient with an elevated temperature, as the child may be in the incubation stage of an infectious fever; (7) Operation should not be performed upon diabetics, as these patients are bad subjects and sepsis is likely to follow; (8) Moore[9] holds that it is unjustifiable to operate for the relief of arteriosclerosis; (9) The tonsils should not be removed merely because an operation for adenoids is called for; (10) Hæmophilia.

Tonsillectomy in Singers.—The advisability of removing the tonsils in singers has been frequently discussed. Vorhees[10] has questioned a large number of physicians and singing teachers on the subject, and has come to the following conclusions: In the hands of skilled operators there need be no special fear of bad results following enucleation of the tonsils. Bad results are most often due to cicatricial contraction, the result of careless dissection or neglect of after-treatment. Loss of singing voice occurs very rarely after tonsillectomy. Most cases show an increased range of from one-half to a full tone. Post-operative care is of special importance. The patient should be seen daily until full healing occurs.

Enucleation of the Tonsil.—The result we should aim at is a complete removal or enucleation of the tonsils without damage to the surrounding tissues. It matters little whether one uses a guillotine, or dissects out the tonsil with the aid of a knife or scissors and snare (with or without finger dissection), so long as the results are good.

In children, enucleation with the guillotine is easy, once the knack is acquired (M'Kenzie). Enucleation removes the whole tonsil, yet

spares the faucial pillars and part of the capsule, so that the fossa, or bed of the tonsil, is not obliterated by scar tissue, and the natural formation of the throat is preserved. The knack of guillotine enucleation lies in adjusting the ring of the instrument accurately round the tonsil from below and behind, and in pressing the tonsil firmly forwards and upwards till the soft palate and anterior pillar bulge markedly. The thumb or index finger of the surgeon's free hand is pressed on this bulging till he feels the tonsil turn itself inside out through the ring of the instrument. The blade is then pressed home and the tonsil removed on the posterior surface of the instrument. According to M'Kenzie there are two parts of the tonsil which the blade is liable to slice—the upper and the lower poles. The deep or attached surface of the tonsil should always be examined immediately to make sure that it is entire. To do this the tonsil usually has to be inverted, i.e. returned to the condition in which it exists as it lies on the tonsil fossa. If the tonsil is not entire, the guillotine should be reinserted and the remaining portion removed.

In adults, in many cases, the tonsils are tough and adherent. In such cases local anæsthesia is usually employed, and the tonsils are removed by dissection.

Ersner[11] employs normal saline solution instead of 0·5 per cent cocaine or 1 per cent novocain for submucous infiltration. The anterior and posterior pillars are first swabbed with 10 per cent cocaine, and a little later 3 drachms of normal saline are injected around each tonsil in the following situations: superior and inferior poles, one injection each; anterior and posterior pillars, two injections each. When infiltration is perfect the tonsil bulges out and becomes pale owing to retrotonsillar pressure. If the patient's heart is in good condition, 2 min. of adrenalin are added to the solution for each tonsil. Ersner claims that by this method post-operative sloughing is avoided, healing is promoted, and most patients are able to take food without difficulty within twenty-four hours of operation.

Crowe, Watkins, and Rothholtz[2] prefer the patient in the lying position with the head hanging, and advise that the nasopharynx be plugged with gauze. The operator wears an electric head-light. The gag and tongue depressor are inserted. One tonsil is seized with a tenaculum and the upper pole pulled towards the median line. An incision is then made through the mucous membrane just internal to the anterior pillar. A retractor is then inserted. The tonsil is removed by sharp dissection with scissors, keeping as close as possible to the capsule. Every bleeding vessel is clamped and, at the end of the operation, ligatured with black silk and a curved needle.

Circumcision of the Tonsil.—Murphy[12] is convinced that more than 90 per cent of the tonsillectomies performed to-day will be abandoned for a more scientific, practical, and safe method, namely, circumcision of the tonsil. This operation can be performed in the consulting-room with the aid of local anæsthesia. The plica is first separated from the anterior pillar by means of an elongated U-shaped punch,

which must cut to the bottom of the anterior fossa, i.e. the space between the anterior pillar and the tonsil. A blunt hook should be used to make sure that a crypt has not been opened instead of the anterior fossa. The plica should then be removed with the Hartmann tonsil punch for about a quarter of an inch below the bottom of the anterior fossa, and also along the posterior edge of the incision. When the operation is complete, the blunt probe should pass freely over the tonsil. At the end of a week the incision should be inspected for adhesions, which, if present, are easily broken down with a blunt probe. After operation Murphy applies 2 per cent **Iodine in Glycerin** to the raw surface. Murphy compares his operation to circumcision, and claims that it removes a foreskin (the plica triangularis) which obstructs the proper drainage of the tonsillar spaces.

Post-operative Complications.—M'Kenzie holds that tonsillar *hæmorrhage* is almost always primary. When the patient has returned to bed he should not be allowed to lie on his back, but should be placed semi-prone on his side, with his face turned half down and with a basin under the mouth and nose. In this position the blood runs out of the nose or mouth instead of being swallowed. M'Kenzie gives the following directions for the examination of the throat in a case of post-operative bleeding: A Doyen gag should be inserted, and a good light reflected from a forehead mirror on to the tonsil region. If one tonsil fossa is seen to be occupied by a large clot, that fossa is the culprit. If in doubt whether the hæmorrhage is coming from the tonsil fossa or from the adenoid area, the patient's head should be held face downwards, for in that position blood from the adenoids emerges at the nose while hæmorrhage from the tonsil comes from the mouth. If it is tonsil hæmorrhage the clot must be cleared out by means of a sponge on a sponge-holder. The anterior pillar must then be held aside with a hook so that its posterior surface may be inspected. This is the favourite site for a tonsil spouter. If the bleeding point can be seen, it must be picked up with pressure forceps. The fossa should now be sponged out and other bleeding points looked for. When all have been seized, ligatures should be applied if possible. If ligation is impossible, the gag should be removed and the forceps left in position for twelve hours. (Instead of attempting to catch and ligature the bleeding vessels the surgeon may apply a sponge—wrung out of peroxide of hydrogen and held in a sponge-holder—to the bleeding tonsil fossa. Firm pressure for from ten to twenty minutes is usually sufficient to stop the hæmorrhage.) Watson Williams's tonsil clamp is useful. The two ends of the clamp are padded with gauze, and the end meant for insertion into the tonsil fossa is soaked in hydrogen peroxide. This end is then placed in the bleeding tonsil fossa, while the other lies externally over the angle of the lower jaw. A hypodermic injection of morphia is a useful adjunct.

Hæmorrhage from the adenoid region is rare and is usually due to incomplete removal of the growths, which leaves a tag on the wall of the pharynx. If so, it can be stopped by completing the operation.

Otherwise it is most easily controlled by one or two sponges in the nasopharynx.

For controlling hæmorrhage, Moore[9] mentions **Thrombokinase** or **Coagulen.** Human blood-serum or diphtheria antitoxin may be injected. In the treatment of hæmorrhage, transfusion by the multiple syringe method may be used.

Morris Manges[13] reports nine cases of *abscess of lung* after tonsillectomy in adults. Richardson,[14] who reports three cases of his own in which a pulmonary complication arose, does not consider that these sequelæ and complications are always due to want of skill. More frequently they are beyond the control of the operator and wholly independent of the care and attention paid to the post-operative management of the case. The results obtained after removal of the tonsils do not always compensate for the risk through which the patient passes. Wessler[15] considers that the term 'lung suppuration' is more accurate than abscess or gangrene of the lung. In all eight cases examined by him a general anæsthetic was administered. After an incubation stage of a few days, symptoms of bronchopneumonia arise, and later there is evidence of suppuration. The sputum is foul at some time or other. Hæmoptysis is a very constant symptom. Pain is frequent, and due to associated pleurisy. A predilection for the right lung was noted in six out of eight cases. Any lobe may be affected. In six of the cases spontaneous recovery took place in from six weeks to five months. In five cases a cavity was demonstrated, in some with a fluid level which altered with the change of position of the patient. When filled with secretion, cavities may be invisible, but are brought into view after copious expectoration.

Of 1000 cases in the Baltimore Report, post-operative pneumonia occurred in 2 instances and acute otitis media in 4, suppurative cervical adenitis in 2, post-operative fever in 3, tetany in 1, erysipelas in 1, infection of the maxillary antrum in 1.

Of M'Kenzie's 5000 cases 5 died—1 from the anæsthetic; 1 from post-operative pneumonia; 1 from meningitis following post-operative otitis media; 2 from general sepsis. Thus three of the five fatal cases were due to sepsis, and in all three M'Kenzie states that the mouth was the source of infection.

The Tonsils as an Atrium of Infection in Infantile Paralysis.—Seydell[16] states that paralysis only appears in one out of every four cases of anterior poliomyelitis. The work of Mathers, Nuzum, and Rosenow shows definitely that the organism of this disease is a Gram-positive micrococcus, which has been found in the spinal fluid, in the brain and cord, and also in the tonsils of the same cases. The micrococcus is polymorphous. The smaller forms can pass through a Berkfeld filter. Rosenow[17] has produced paralysis with lesions in the central nervous system in guinea-pigs, rabbits, dogs, cats, and monkeys by intravenous and intracerebral injections. He produced the same lesions by injecting emulsions of pus expressed from the tonsils. Younger animals are more susceptible to inoculation than

older ones. The incubation period varies from thirty hours to fourteen days, and the picture produced in the monkey is typical, both clinically and pathologically. Seydell believes that the tonsils play an important rôle in the pathology of the disease. In many cases acute poliomyelitis is preceded or accompanied by nasopharyngeal inflammation. In 25 cases of infantile paralysis in which the temperature remained high and paralysis was progressing, tonsillectomy was performed. No bad results were observed ; the temperature came down and convalescence was rapid. Rosenow suggests the advisability of removing the tonsils in this type of case. Meyer and Seydell have studied 200 cases of infantile paralysis. Ten of the patients died. In 15 cases there was an angina as an initial symptom. In only 3 cases had the tonsils been operated upon. In most of the others the tonsils were small. In the 3 previously operated cases the paralysis was slight and recovery rapid. Rosenow's experience is similar to that of Meyer and Seydell.

References.—[1]*Jour. Amer. Med. Assoc.* 1914, 1636 ; [2]*Johns Hop. Hosp. Bull.* 1917, Jan. ; [3]*Jour. Path. and Bacteriol.* 1917, xxi, 263 ; [4]*Lancet*, 1914, i, 1106 ; [5]*Med. Rec.* 1917, 1134 ; [6]*Laryngoscope*, 1917, 490 ; [7]*Brit. Med. Jour.* 1917, ii, 686 ; [8]*Pract.* 1917, Aug. ; [9]*Med. Rec.* 1916, 972 ; [10]*N. Y. Med. Jour.* 1916, ii, 1183 ; [11]*Ibid.* 1917, i, 21 ; [12]*Ibid.* 785 ; [13]*Jour. Amer. Med. Assoc.* 1915, May ; [14]*Laryngoscope*, 1916, July ; [15]*Jour. Laryngol. Otol. and Rhinol.* 1916, Sept., 408 ; [16]*Ann. Otol.* 1917, March, 98 ; [17]*Amer. Jour. Med. Sci.* 1914, 380.

TORSION SPASM OF CHILDHOOD, PROGRESSIVE. (*See* Spasm).

TRENCH FEVER. *E. W. Goodall, M.D.*

This disease, first described as occurring amongst the troops engaged in Belgium and France, has since been met with in Salonica (A. F. Hurst),[1] Mesopotamia (C. F. Coombs),[2] and in England (R. D. MacGregor,[3] J. Ramsay[4]). While there have been a large number of cases in the West and in Salonica, Coombs saw only three or four in Mesopotamia. MacGregor's case is of interest, because the patient had never been out of England ; but he was a hospital orderly, and was in attendance upon patients suffering from trench fever contracted in France. Ramsay gives no details of the cases he alludes to as 'so-called trench fever,' so one is somewhat doubtful whether they were really instances of the affection that goes by the name of trench fever.

It is now generally recognized that there are two forms of the disease : the short, and the long, or periodic. The former lasts only three or four days, and then there is a relapse of two or three days' duration. In the long or periodic form the primary attack may last one to five days, and it is followed by periodic relapses occurring at intervals of four to eight days ; the number of relapses may run up to five or six. According to Hurst, the second form of the disease was prevalent in Salonica since December, 1915, and the first variety since March, 1916. The disease occurred in ammunition columns several miles from the trenches, as well as in front-line troops and hospital attendants. Hurst adduces evidence to show that the

disease was most probably imported to Salonica from France. He suggests that the two varieties are really different diseases. He agrees with most other observers that the infection is conveyed by lice, and relates the following case: "A hospital orderly, who had been free from lice since his arrival in Salonica, had to carry the kit of a number of new patients suffering from trench fever on May 2, 1916. The clothes were swarming with lice, and the same evening he found some in his own clothes. He got rid of them in the course of a few days, and on May 20 an attack of trench fever began. He was not employed in the wards, and he never came in contact with any patients suffering from the disease." In this connection the experiment carried out by F. C. Davies and R. P. Weldon[5] is of importance: "Some scores of lice were collected and starved in captivity for three days; a number of them died. Two pairs of the survivors were taken and allowed to bite, under a watch-glass, two patients suffering from 'trench fever' in an acute stage. After allowing them to feed for about fifteen minutes their meal was interrupted, and each of us then allowed a pair to feed upon himself, strictly confining their sphere of operation by means of a securely-fixed watch-glass. The one of us whose duties did not bring him into the wards subsequently, twenty-four hours later, allowed his pair to have a further meal on himself. Twelve days later very startling developments took place. The characteristic symptoms manifested themselves, and he passed through a most typical attack of the condition of average severity, with the pains and other features all present. It may be noted that the victim had not been at any time nearer to the front than the base, nor had he been subject to any previous similar condition."

According to Hurst, the incubation period may vary from fifteen to twenty-five days. He relates a case which goes to show that one attack does not necessarily protect against a second. As regards the symptoms, he states that he met with a few cases in which quite early in the attack there were present abdominal pain, distention, and tenderness, with nausea, and even vomiting, so that the diagnosis of appendicitis was made in four cases. Occasionally, in the first attack, the spleen may be enlarged. Leucocytosis is often present, with a relative increase in the large mononuclear cells. The hæmoglobin is somewhat diminished, but not the number of red corpuscles.

Hurst met with no fatal and practically no complicated cases, with the exception of cardiac dilatation leading to 'soldier's heart' in the hot weather in certain patients who were sent back to duty too soon.

According to T. Houston and J. M. McClory,[6] the enterococcus has been found by them in the blood of a few cases of trench fever; and as they obtained good results by treatment with **Vaccine** of enterococcus, they believe that that organism plays a part in the production of the disease. The general opinion, however, is, that the cause of the disease, whatever it may be, is confined to the red corpuscles.

REFERENCES.—[1]*Lancet*, 1916, ii, 671; [2]*Ibid.* 1917, i, 183; [3]*Brit. Med. Jour.* 1917, i, 221; [4]*Ibid.* 1917, i, 222; [5]*Lancet*, 1917, i, 183; [6]*Ibid.* 1916, i, 632.

TRENCH FOOT. *W. I. de C. Wheeler, F.R.C.S.I.*

Raymond and Parisot[1] state that further experience has confirmed their assumption that the so-called trench frostbite is an infection from some fungus germs, normally in the soil, which acquire pathogenic properties for man under long standing in cold water. Similar affections can be induced in animals by submitting them to stagnation and wet cold. Conditions are like those in the experiments of Pasteur with chilled hens. Treatment based on this etiology has given good results, especially dressing the foot with cotton dipped in a mixture of 1·1 grm. **Pulverized Camphor**, 15 grms. **Sodium Borate**, and 1000 grms. boiled water. Among 1093 cases in Africans, October to January, there were four deaths from septicæmia or tetanus, but 95 per cent were cured without a mutilating operation. Of the 232 Arabs, none died and 95 per cent were cured without an operation. Of 891 French soldiers, all but 50 returned to active service in from three to five weeks, and only 5 required an operation. Only 2 had to be discharged from active service.

Chalier[2] recommends the following treatment of trench foot. A block of **Paraffin** is melted and poured into a foot-shaped metal vessel carried in all ambulances and known as a 'haricot.' The patient's foot is plunged into this paraffin bath when sufficiently cool, and at the same time a 1 per cent solution of **Novocain** is added. Ten c.c. of novocain to 200 c.c. of paraffin is the proportion recommended. In a very short time a white waxlike varnish is obtained, which covers and adheres to the foot. A fresh application is made every three or four days. All pain completely disappears. More recently Chalier has substituted **Cocaine** for novocain, and added 2½ grms. of **Menthol** to 1000 grms. of paraffin.

References.—[1]*Paris Médical*, March 24, vii. No. 12, pp. 229–288 (abstr. *Jour. Amer. Med. Assoc.* 1917, May; [2]*Pract.* 1917, June, 497.

TRENCH NEPHRITIS. (*See* Nephritis.)

TRENCH SHIN AND ALLIED CONDITIONS.

Herbert French, M.D., F.R.C.P.

The relative absence of success of most of the more ordinary lines of treatment for the recurrent shin pains, cephalalgias, and myalgias following trench fever renders welcome any accession to the measures that may be adopted for their relief. J. D. Comrie[1] reports very favourably of the use of **Colloidal Sulphur** given by subcutaneous injection, in this respect. Since reading his paper I have used his method in a considerable number of cases, and so far the results have been most encouraging. The difficulty in the first instance is to obtain the colloidal sulphur ready for use. The preparation used by Comrie was made up by Mr. George Lunan, Queensferry Street, Edinburgh, who supplies the following note as to its production :—

"The process used in the manufacture of colloidal sulphur, 1–1000, is as follows: hydrochloric acid (10 per cent), 22 mils; sodium sul-

phide, 5 grms.; sodium sulphite, 2·6 grms.; white of two eggs; sterilized water to 1 litre. Dissolve the sodium sulphide and sulphite each separately in 250 mils of the water, mix together; add the white of egg and thoroughly mix. To this solution add the hydrochloric acid, diluted with 250 mils of the water. The solution is then to be thoroughly mixed, warmed slightly, and sufficient sterile water added to make up to 1 litre. The solution, after being carefully dialyzed to remove crystalloids, is then ready for use. Theoretically, the product should contain 1–1000 of colloidal sulphur. In use the dose of 1 mil is rendered isotonic by the addition of 2 decimils of 5·5 per cent saline solution mixed immediately before injecting."

The dose with which Comrie has been in the habit of commencing is 1 mil (i.e. about 17 min. of the colloidal sulphur solution made up to 20 min. with the saline solution), injected into the painful area of muscle. If no reaction results, the dose may subsequently be doubled, the point of injection being slightly varied each time. In a course of ten injections the affected muscle receives into its substance approximately $\frac{1}{50}$ grm., or $\frac{1}{3}$ gr., of nascent sulphur, which is gradually absorbed.

The following notes summarize the effects of treatment in 60 consecutive cases. Severe cases only, or cases of prolonged duration, were chosen for these initial trials, but a large number of other severe and also slighter cases among soldiers and civilians have since been treated with equally satisfactory results.

The 60 cases included 24 expeditionary and 36 non-expeditionary men. As regards duration, the pains were referred in almost every expeditionary case to repeated wettings in flooded trenches, and had lasted several months—usually six to seven—before admission to hospital. In the non-expeditionary cases the cause and duration were more varied, but some form of exposure was usually blamed. Some cases among the latter were chronic or recurrent for several years, and naturally these proved highly refractory to any form of treatment.

From the standpoint of result the 24 expeditionary cases showed in 14 complete cure, this result being attained after an average treatment of five weeks' duration; 7 of the cases were much improved: while 3 were ultimately discharged as medically unfit (D.M.U.) for further service, 2 of these for conditions other than the myalgia. Of the 36 non-expeditionary cases, 17 were completely cured, after an average treatment lasting three weeks; 12 cases were much improved; and 7 were discharged (5 of these for valvular disease of the heart). Half of all the cases were thus completely cured, and one-third were very much benefited, but passed out of observation before it could be determined whether they would become quite free of their trouble.

The method of treatment finally adopted was to keep the patient in bed for the first fortnight, and to give the colloidal sulphur (beginning with 1 mil dose and rising to 2 mils if no reaction took place) every second day for three weeks. With this were combined massage

on the alternate days, and occasional hot alkaline baths. Commonly there was no general or local reaction, but in some cases the temperature rose about 2° on the day after an injection; and now and then a painful swelling developed at the site of the injection, which was, however, dissipated readily by massage.

Graham Chambers[2] holds the conviction that the severe pains, particularly in the shins at night, suffered by those who have had trench fever at the Front, and also by others who have not had definite trench fever, are the result of toxæmia from an infective agent, and therefore come into line with other forms of infectious fibrositis. He considers that the various and vague myalgias of returned soldiers have a similar organic cause. His paper should be consulted for full clinical details, and for references to the literature upon the subject.

References.—[1]*Lancet*, 1917, i, 991; [2]*Ibid.* 752.

TRENCH THROAT. (*See* Vincent's Angina.)

TRICHINOSIS. *Herbert French, M.D., F.R.C.P.*

The following observations of R. F. Salzer[1] were made in the course of a study of an epidemic of fourteen cases of trichinosis in which the patients were admitted to the wards of the St. Joseph's Hospital at Far Rockaway, N.Y. The laboratory studies were made partly in the laboratory of the hospital and partly in Salzer's home. Observations 1 to 6 inclusive represent confirmation or amplification of findings already made by other authors. All the other findings are claimed to be new.

1. The Kernig reaction was present in all the cases.
2. Œdema of the face occurred in all the cases.
3. Œdema of the lower extremities occurred in six cases.
4. The reflexes in the lower extremities were abolished in all the cases, and are still absent now (six months having elapsed since the cases first came under observation).
5. Trichinæ were found in the blood in nine cases of the fourteen.
6. Trichinæ were readily found in the cerebrospinal fluid in eight of the fourteen cases.
7. The diazo-reaction was in direct proportion to the degree of eosinophilia.
8. Gangrene of one lower extremity was observed once.
9. The leucocytosis diminished as the eosinophilia increased. The blood-coagulation time is markedly prolonged in trichinosis.
10. In one case trichinæ were still found in the cerebrospinal fluid of a child three years of age, three months after clinical recovery.
11. Trichinæ were found in a pleural exudation once.
12. Trichinæ were not found in the urine in any case.
13. Trichinæ were not found in the uterus, but were abundantly present in the placenta.
14. Trichinæ were present in large numbers in the milk of a nursing woman, and were found in the piece of excised mammary gland.

15. In one case complicated by furunculosis, trichinæ were found in the pus of a furuncle of the external auditory canal. On inoculation into a rabbit, trichinosis was produced.

16. In two cases the duodenal tube was passed under control of the fluoroscope. In one of the two cases trichinæ were abundantly found. This patient is now suffering from cholecystitis.

17. The fæces were clay-coloured throughout the disease in every case, and have the same appearance in the five cases that have remained under observation. From experimental studies it appears probable that the colour is due to the reduction of bilirubin by living trichinæ.

18. In a cat which accidentally developed trichinosis after eating a rabbit in which trichinosis had been experimentally produced, the stools were also found to be clay-coloured.

19. Trichinæ were present in the stools of all the cases throughout the disease and in three cases in which studies in this direction were carried on after recovery. They are easily proved to be present by making the stools alkaline and allowing them to stand from twelve to twenty-four hours.

20. Trichinosis was produced by the injection of pleural fluid from a case of trichinosis.

21. Trichinosis was produced by feeding fæces from cases of trichinosis to two dogs.

22. On feeding infected meat to animals the eosinophiles appear usually within the first five days. In one case 10 per cent of eosinophiles were found after thirty-six hours. There was no leucocytosis when the eosinophilia first appeared.

23. The blood of a series of infected animals was examined for trichinæ. After five days' examination it was negative in all. The first trichinæ were found on the seventh day, two or three then being seen in each field. The temperature during the first five days remained from 100° to 101°.

24. Trichinæ were absent in the heart muscle, as was also the eosinophilia. Feeding the heart muscle to animals gave negative results.

25. Intraperitoneal injection of urine from cases of trichinosis caused no infection.

26. Trichinæ occurred abundantly in the brain, and on injection of such tissue into animals the disease can be produced, the eosinophilia being more marked than any other form of production of the disease.

27. Trichinæ were found abundantly in the pancreas.

28. As many as four coiled trichinæ were found in muscle fibres.

29. Ascites occurred in the experimental disease in animals.

30. The use of serum from human patients who recovered removed the eosinophilia persisting after recovery in man or animals within forty-eight hours.

31. The injection of normal serum had no therapeutic value in trichinosis in man or animals. The same is true of salvarsanized serum and salt solution.

32. In animals the injection of convalescent serum gives an almost

complete prophylactic result. Animals fed with infected meat within twenty-four hours after the administration of the serum may develop a mild form of trichinosis. Animals fed at a period later than that prove to be immune. All these experiments were controlled.

33. If immune serum is mixed with infected meat and then fed, the animals do not develop trichinosis, although the ingestion of the same meat without the serum is invariably followed by the appearance of the disease.

34. In two cases of trichinosis in the very active stage, the use of immune serum proved to be of remarkably curative value. There was a decided drop in the temperature within six hours, and the abnormal temperature was entirely gone within forty-eight hours. The eosinophilia showed a considerable drop within six hours ; there was then a secondary rise, and then a return to the figures found in normal blood within forty-eight hours.

35. In twenty-four rabbits suffering from the disease experimentally produced, the immune serum had a curative effect within twenty-four hours.

It is a pity that more details are not yet to hand upon the dosage of serum from a convalescent case that is required to cure a patient in the acute phase of the disease ; when the doses are to be repeated ; and how given—subcutaneously, intramuscularly, intravenously, or otherwise. There are, however, so few therapeutic measures known at present for the relief or cure of trichinosis that fresh suggestions are welcome ; and although Salzer's claims regarding the value of immune serum from cured cases may seem too good to be true, they at least merit being known and tested by trial.

The second stage of the trichinosis infection is difficult of treatment, because the parasite has left the intestinal canal and has lodged itself in the muscles and other tissues of the body which it is difficult to reach by means of remedies administered by mouth. It is futile to give **Thymol** by mouth after the parasite has wandered out of the alimentary canal. The thymol does not circulate in the blood as such after its absorption from the alimentary mucous membrane. Its antiparasitic properties are neutralized in the liver in the following manner. Thymol is meta-isopropyleresol. From the intestine it is absorbed into the portal circulation, and there conjugated with sulphuric and glycuronic acids and excreted in the ester form in the urine. This process of conjugation is the means used by the body to detoxicate the aryl compound. It is obvious, then, that in order to attack the trichinæ in the muscle and tissues, a method of administration of thymol other than by the mouth must be resorted to. Parenteral injections of thymol would exclude the conjugating influence of the liver. The thymol would be absorbed in the blood and would circulate as such, and thus be able to attack the parasite *in situ*.

From the success that Max Kahn[2] has obtained in the treatment of trichinosis in the Western Pennsylvania Hospital at Pittsburgh, he suggests the following method of procedure : 50 gr. of **Thymol** are

dissolved in 50 c.c. of sterile olive oil which had been autoclaved for several minutes. The solution is then resterilized and used. The patient is given from 2 to 3 c.c. of this solution subcutaneously or intramuscularly daily for seven days. The urine is examined daily for evidence of any kidney irritation, in which case the administration of thymol should be stopped, or the dose reduced for a few days. After a week, administration should be discontinued for about a week or ten days, and then a week's treatment should be again instituted.

In Kahn's experience, such a course of treatment does not induce any toxic effects due to the thymol. In cases in which a septic temperature occurs, the temperature becomes normal after four or five doses. The pain in the muscles, the œdema of the eyelids and face, the dull mentality of the patient, all due to the parasitic influence, become relieved very quickly. With the destruction of the parasite in the tissues the eosinophiles in the blood become much increased, and sections of the muscles show destructive processes around and in the parasite. He has observed that after thymol administration, showers of leucocytes appear in the urine, which upon staining were proved to be mostly eosinophiles. Before thymol treatment this was not observed in the same cases. In normal individuals administration of thymol does not induce an eosinophilia, nor do eosinophiles appear in the urine after thymol injections.

It may be advisable to try this method of treatment in cases of cysticercus, filaria, and echinococcus invasions of the tissues.

Although most authorities record little if any benefit from the use of **Salvarsan** or **Neosalvarsan** in the treatment of trichinosis, J. B. and W. B. McNerthey[3] report a case in which a man, who had gone progressively downhill for fifteen weeks from trichinosis, was given a single dose of neosalvarsan intravenously, and forthwith began to improve. Though he had lost 60 lb. in weight, was pyrexial, and had no power of movement in any of his limbs on account of extreme pain and stiffness in them up to the time of having this treatment, he was able to walk with crutches a fortnight after the injection, could manage without crutches at three weeks, and went on to an uninterrupted recovery. Neosalvarsan would seem to be of some value, therefore, when given intravenously in some cases.

References.—[1]*Jour. Amer. Med. Assoc.* 1916, ii, 579 ; [2]*N. Y. Med. Jour.* 1917, i, 1137 ; [3]*Jour. Amer. Med. Assoc.* 1916, ii, 1086.

TRYPANOSOMIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

H. L. Duke[1] has investigated trypanosomiasis in Northern Uganda, where a dog had been found infected with a trypanosome somewhat resembling the deadly Rhodesian form, giving rise to the fear of the inhabitants becoming infected with it. Duke found no reason to fear this occurrence, as his studies showed only *T. brucei* in animals, while none of 288 natives in the fly belt presented any enlargement of the glands or other signs of trypanosomiasis.

Reference.—[1]*Jour. Hyg.* 1916, Sept., 372.

TUBERCULIDE. *E. Graham Little, M.D., F.R.C.P.*

Chalmers and Martyn[1] record a most interesting case of acnitis in a native Egyptian, a soldier, age 27. The eruption appeared acutely on the face and neck, outer ears, and dorsal surface of hands, and was accompanied by a rise of temperature to 100°. It consisted of papules distributed apparently in parts exposed to light. When pricked, the papule bled but showed no vesication. There was no itching. The eruption disappeared within a few days with intestinal disinfection, but reappeared in about a week, this time with some pustulation, but otherwise like the previous attack. The sputum was examined for tubercle bacilli, but none were found. The man gave a very full von Pirquet reaction. Contents of an excised papule were injected into a guinea-pig, with no ill results to the animal. Recent and old papules were examined histologically, and their appearance confirmed the diagnosis of 'acnitis.' No tubercle bacilli were found in any of the sections. The authors therefore class the disease with the tuberculides, i.e., as depending upon the presence of tubercular toxins or antibodies, but showing absence of tubercle bacilli.

The authors comment on the distribution as suggestive of light proving a factor of importance in determining the incidence of the lesions, and offer the explanation that acnitis is the response of the skin, a 'cuti-reaction' in fact, to the combination of antitubercular amboceptors in the cells of the skin with an unknown bacterial product from the intestinal tract, under the influence of sunlight, which acts as an adjuvant, just as high temperatures may do.

The treatment adopted was as follows. The patient was given small doses of **Calomel** every night, followed by **Salines** in the morning, and in addition cachets of **Salol** with **Sod. Bicarb.** three times a day. **Calamine Lotion** was used for the face, neck, and hands.

Reference.—[1]*Proc. Roy. Soc. Med.* (*Derm. Sect.*), 1916, Nov., 23.

TUBERCULOSIS. *Arthur Latham, M.D., F.R.C.P.*

Major Charles Craig[1] states that in his experience the **Complement-fixation Reaction** is a valuable method of detecting the presence of active tuberculosis. It is also of value in deciding upon the necessary length of treatment, as by its aid tuberculous infection which is still active is often demonstrated in patients who, from the clinical standpoint, appear to have had the disease arrested. He believes that a positive reaction indicates the presence of an active focus, and so long as a positive reaction is obtained, further treatment is required. A single negative test cannot be relied upon, but repeated negative tests exclude the presence of active tuberculosis.

In the course of a paper on the Rollier treatment of tuberculosis, Clarence J. Hyde and Horace Lo Grasso[2] state that when using **Heliotherapy** certain precautions must be used, and the directions followed minutely, as sun-baths may prove very injurious when given improperly. No insolation is attempted from three to ten days after

a patient's admission to the institution; but during this period he gradually becomes accustomed to the action of the air and sun, and to the out-of-door life in general. He is at first made to rest and sleep in bed in his room with windows or doors open. Then his bed is rolled out on the open porch for about an hour the first day, and the time is increased daily, until he is able to be in the open air practically the entire twenty-four hours of the day. During this time a record is made of the temperature, pulse, respiration, and of the urine and blood findings. After this preliminary observation period, the patient is ready for the real solar bath. No sun-bath is given later than half an hour before a noon meal, and not sooner than two hours afterwards. The treatment is carried out in bed, or on a flat couch, and is always started by exposing the feet first, without regard to the site of the lesion. Sinuses and ulcers are exposed to the sun after the whole body has been gradually insolated. In cooler weather, in order that chills may not occur, and thus lower the patient's resistance, care must be exercised that no breeze strikes the body. This can be accomplished by wind-breaks or screens. The head is protected by a linen cap, an umbrella, or a small awning at the head of the bed, and the eyes are shaded by means of coloured glasses. The author uses a towel over the eyes and forehead, which serves to protect the patients satisfactorily. After each insolation the patient is vigorously rubbed with spirits of camphor, using a glove made of rough material.

Great care must be exercised during the first formation of pigment, and while the patient is becoming accustomed to the sun. We must watch that no dermatitis and no reaction, such as high pulse, rise of temperature, headache, nausea, or other constitutional disturbance, take place. In feeble patients, and where there is considerable fever, the insolation must be of shorter duration and regulated very carefully, and if any reaction is noticed the exposure is stopped or the dose decreased. It is at this stage that a patient is likely, in his enthusiasm, to over-expose himself, and needs most careful watching. In summer, it is not advisable to take sun-baths during the hottest hours of the day, as at this time solar radiation is depressing and fatiguing, and likely to produce serious reactions. After the treatment has progressed for some time, and weather conditions are such that the sun cure cannot be taken, an air-bath is given, the time of which is regulated in each case. This depends upon the general condition and resisting power of the patient. Usually an air-bath of ten to twenty minutes is sufficient.

The universal employment of the *Wassermann reaction* has revealed the striking frequency of a syphilitic infection in persons suffering from tuberculosis. In ten years of prison service Tedeschi found that 70 per cent of the cases of pulmonary tuberculosis had developed upon a luetic soil! Among 346 tuberculous inmates of Boucicaut Hospital, 19 per cent (64) gave a positive Wassermann reaction, although only 3 per cent (10) acknowledged a syphilitic infection or showed any signs of it. Among 116 patients at the Brompton Hospital

with pulmonary tuberculosis selected at random by Inman, only 5 per cent (6) gave a positive Wassermann reaction. Professor Bowditch Potter[3] cites a number of instances in which **Salvarsan** has been used in such cases, and concludes :—

1. The prompt employment of salvarsan or neosalvarsan is indicated in latent chronic or moderately active tuberculosis : (*a*) As soon as the nature of an added infection is diagnosed with reasonable probability to be syphilis : (*b*) Whenever the history, signs, or symptoms strongly suggest a previous luetic infection, particularly if such a patient is not improving upon the usually successful hygienic and climatic treatment for tuberculosis : but (*c*) Active tuberculosis, acute tuberculosis, and diffuse miliary tuberculosis are usually definite contra-indications to the use of these new arsenic preparations, though in both the first two named groups there will be found many luetic patients upon whom a small dose of salvarsan may well be tried and, unless followed by untoward effects, cautiously repeated in gradually increasing doses.

2. When tuberculosis infects, or becomes active in, a patient with secondary, tertiary, or even latent syphilis, the careful employment of one of these drugs is also indicated.

3. The more active the tuberculosis, the smaller should be the initial dose ; the slower its increase, the less frequent the interval, and the greater care and watchfulness required.

4. Tuberculin-like focal reactions which may follow the administration of these remedies should be carefully watched for, and, if present, the location, intensity, and character will frequently guide in the selection of the next appropriate dose or interval.

X-rays in tuberculous conditions (p. 55) ; and **Ultra-violet Rays** (p. 61).

References.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 773 ; [2]*N. Y. Med. Jour.* 1917, i, 11 ; [3]*Amer. Jour. Med. Sci.* 1916, ii, 823.

TUBERCULOSIS IN CHILDREN. *Frederick Langmead, M.D., F.R.C.P.*

The late Prof. Combe,[1] in his last work, wrote in favour of the systematic treatment of tuberculosis in infants by **Tuberculin.** He held that if the dose is properly adapted, there is a regular formation of antibodies, leading to general immunization and to the production of focal cicatrices. The index of the effect of tuberculin injections is found in the intradermal tuberculin test advocated by Mantoux. He employed this test at regular intervals as a means of detecting whether the dose was excessive and causing anaphylaxis, or was promoting immunization. The dose of tuberculin given at first was $\frac{1}{10}$ mgrm, which he increased at three-day intervals up to a decigram, or even to 50 cgrms., testing the result with intradermal injections of $\frac{1}{10}$ mgrm every two weeks. Progressive lessening of the reaction to the test, while the therapeutic dose is being increased, shows that immunization is proceeding, and that the tuberculous focus is healing. If, on the other hand, the reaction becomes more pronounced, the

infants are not being benefited but harmed, and the tuberculin should be stopped at once.

He gave the therapeutic injections intradermally, finding that the subcutaneous method was disastrous. By this method the organism becomes tuberculinized without risk, when it would be refractory to subcutaneous injections, by which the whole dose passes at once into the blood. Ten years' experience with tuberculin treatment has convinced him of its value in localized tuberculosis of infants and children; he regards it as contra-indicated if there are any signs of general tuberculosis.

He also obtained encouraging results with **Röntgen Rays** in tuberculous glands and tuberculous osteitis, and thought it worthy of trial, especially for the latter. He recorded also a case of an infant suffering from tuberculous peritonitis with a lesion at an apex of the lungs. The latter was exposed to *x* rays three times at eight-day intervals, and at the autopsy the lesion was found to be arrested and practically walled in. The thymus was atrophied. Combe concluded that if all this arose from the treatment, it is contra-indicated for infants.

Reference.—[1]*Le Nourrisson*, v, No. 1 (abstr. in *Jour. Amer. Med. Assoc.* 1917, i, 1668).

TUBERCULOSIS, LARYNGEAL. (*See* Larynx, Affections of.)

TUBERCULOSIS, RENAL. *John D. Comrie, M.D.*

The relative merits of the surgical and of the **Tuberculin** treatment in renal tuberculosis are discussed by Buerger.[1] He points out that in this type of the disease it is important to obtain rapid results from whatever form of treatment is instituted, and that this cannot, even under the most favourable conditions, be afforded by any form of tuberculin therapy. Furthermore, he is of opinion that tuberculin has actually a deleterious effect upon the kidney tissue, although the typical focal lesions of tuberculosis are not produced. He concludes that tuberculin treatment in renal disease is condemned by all the morbid-anatomical facts at our disposal.

The general conditions of curability in chronic renal tuberculosis are considered in a pathologic-anatomical study by Halle.[2] He finds that all intermediate stages of the curative process are met, from the simple encystment of the nodule to its total disappearance, leaving behind only a fibrous scar or a mass of calcareous material; also that a process of extension often takes place, leaving an area of atrophy or a polar cicatrix. However, anatomical recovery is only proved with certainty to occur in closed parenchymatous tuberculosis. When there is open tuberculous pyelitis, spontaneous recovery is rare, if it occurs at all. He concludes, then, that some cases of renal tuberculosis, of various stages, recover by contractile sclerosis, leaving permanent traces in loss of substance and in cicatrices, while the frequency of spontaneous recovery he would assess at about one-third of all the cases of renal tuberculosis.

An inquiry into the reliability of the permanganate urinary reaction of Moritz-Weiss for cases of tuberculosis is recorded by Belgrano.[3] The test is easily effected by adding a few drops of 1 per mille watery solution of potassium permanganate solution to urine diluted with twice its own bulk of distilled water. If a faint brownish-violet tint appears, the test is negative, while a yellow coloration is said to be positive. The test was supposed by its originator to have both a diagnostic and a prognostic value in cases of tuberculosis, but Belgrano finds that it has no special significance beyond occurring in any disease accompanied by rapid cellular destruction (e.g., raised temperature, suppurations, etc.).

References.—[1]*Med. Rec.* 1917, May, 760; [2]*Presse Méd.* 1917, March, 177; [3]*Policlinico*, 1916, Sept., 276.

TUBERCULOSIS, VERTEBRAL. *W. I. de C. Wheeler, F.R.C.S.I.*

From an experience of twenty cases, the ideal treatment of Pott's caries appears to be fixation by **Bone-grafting** as described by Albee. In the average case the patient appeared both from *x*-ray and clinical observation to be completely cured in about six months. A Thomas's frame or Jones's abduction frame makes an admirable splint for the first six weeks. The patient is kept in bed for three months, and for a further three months is instructed to move about with caution, and to rest in the recumbent position as frequently as possible. Two cases became infected—one from a small bedsore, the other following the drainage of a spinal abscess along the course of the graft. In neither case was the entire graft lost. In one a sequestrum was thrown off at the end of a year. One patient, a child, died ten days after operation from acid intoxication.

E. Jones[1] reports upon an experience gained from 33 cases of bone-transplantation for spinal tuberculosis, the patients ranging in age from three years to forty-eight; cases operated upon within the last six months are omitted. The Albee technique was rigidly adhered to in every case except one, where the transplant was grafted laterally into the bases of the spinous processes. The post-operative treatment in adult cases was discontinued at the end of six weeks, except in two cases in which braces were temporarily applied. In the children the post-operative routine was six months of recumbency and heliotherapy. Of the cases, 17 occurred in children. The disease had existed for six months to twelve years previous to operation; the kyphoses were in all stages of prominence; the location of the disease was dorsal in 21, dorsolumbar in 4, and lumbar in 8. The largest number of vertebræ involved was six. The percentage successful results was 96. There was no mortality incident to the operation.

Henderson,[2] of Rochester, U.S.A., comes to the following conclusions: (1) Neither the Hibbs nor the Albee type of operation for ankylosing the disease area in tuberculosis of the spine is in any sense a radical operation for extirpation of the focus of disease. (2) Patients submitted to these procedures should be in good general condition.

Paraplegia *per se* is not a contra-indication. (3) Children are easily controlled on a gas-pipe frame, and should only be operated on after careful observation. The recumbent treatment should be carried out after operation until a cure is attained. In adults, after operation and recumbency for at least four weeks, a suitable brace should be provided, to be worn until symptoms are entirely absent. (4) These procedures in themselves are not serious. A proper selection of patients will give a high percentage of cure and considerably shorten the period of treatment.

Wheeler,[3] after discussing the various theories as to the rôle of the bone-graft in transplantation operations, states that it is interesting to note that just as detached portions of bone lying in a bath of pus in a compound comminuted fracture will survive, so a transplanted graft will survive infection if the infection is not too severe. Furthermore, if a bone-graft is accidentally fractured, it will unite by the formation of callus, and finally a graft will grow and survive in the abdominal wall with or without periosteum. He concludes that a graft is really viable, and behaves to all intents and purposes exactly as it did when it was part and parcel of the bone from which it was removed. Wheeler has applied the bone-grafts in spinal operations laterally in every case as suggested by Sir Robert Jones.

Finkelstein[4] describes a case of *spondylitis deformans* treated by the Albee operation. After bone-grafting and fixation the patient improved very considerably. The author pictures the clinical condition associated with spondylitis deformans as follows: The appearance of these patients is quite characteristic. On standing, they present marked kyphosis of the spine, which is as rigid and unyielding as a board, resulting in forward slope of the neck with the face looking downward. On attempting to look up, the pelvis is tilted backward and the knees are flexed. On walking, they seem on the verge of toppling forward with each step. On lying supine, only a portion of the spine is in contact with the couch, the head, neck, and shoulders being unsupported. On assuming a prone position, only the head and knees are in contact with the couch, the spine and thighs forming an arch. Fortunately, not all cases attain such a degree of severity.

References.—[1]*Calif. State Jour. Med.* 1917, xv, 50 (abstr. *Surg. Gyn. and Obst.* 1917, June, 595); [2]*Surg. Gyn. and Obst.* 1917, May. 600; [3]*Med. Press and Circ.* 1917, March, 205; [4]*Ann. Surg.* 1917, Dec., 713.

TYPHOID FEVER. (*See also* Paratyphoid Fevers.)

E. W. Goodall, M.D.

Diagnosis.—A method of obtaining bile from the duodenum in cases of typhoid carriers is described by A. L. Garbat.[1] The patient, just before retiring for the night, swallows an Einhorn duodenal tube. Next morning he takes a fluid breakfast to assure the passage of the tube into the duodenum and stimulate the secretion of bile. About an hour and a half afterwards the tube and duodenum are washed

out with 8 to 10 oz. of sterile water or saline solution by injecting it through the tube, and, in half an hour, aspiration with a sterile syringe brings forth large quantities of bile. In some instances Garbat obtained 20 to 30 c.c. of pure, clear bile. In two out of twelve convalescent typhoid cases which he examined in this manner, typhoid bacilli were obtained from the bile, though examinations of the stools and urine were negative. Garbat was led to try this method because of the difficulties attendant upon the bacteriological examination of the stools and urine, as it is known that the bacilli are found very constantly in the bile in typhoid fever, and persist therein during convalescence and after.

A short account of eleven cases of fever, in which the *Micrococcus tetragenus* was obtained from the blood is given by A. H. Birks, R. T. Thornley, and R. A. Fawcus.[2] The cases closely resembled typhoid and paratyphoid, though these organisms were not found in the blood, and the serum reactions were negative so far as they were concerned, save in inoculated patients. "The onset may be sudden or insidious, the former being more common. Headache and pains in the lumbar region and down the legs from the knees to the ankles occur in nearly every case; tenderness over the tibia is sometimes extreme." Enlargement of the spleen occurred in three cases, and rose-spots in three. In three there was also a macular rash like that of rubella. The temperature chart may be like that of typhoid or of trench fever. Anæmia is common, and "lethargy is the characteristic mental attitude." There was some evidence of the infectiousness of the disease, as hospital orderlies contracted it. There were no fatal cases. According to these writers the pneumococcus and streptococcus are also common causes of obscure pyrexia at the front. They produce septicæmia.

I. Walker Hall and D. C. Adam[3] have published the results of an investigation of the leucocyte counts in enteric convalescents, and in men inoculated against typhoid. In seventy-one successive cases of the latter they found that the various forms of leucocytes were present within normal limits. In paratyphoid A convalescents, the counts from men who had returned from the Mediterranean area were different from those received from France. The former showed a larger percentage of polynuclears and a smaller lymphocyte content. In one case of paratyphoid B there was hardly any difference, and no other cases were available. In post-typhoid conditions there was to be noted a persistence of low polynuclear and high mononuclear content, long after the pyrexia and acute conditions had subsided, a feature which was in strong contrast with the counts of the anti-typhoid-inoculated men.

As regards the relation of cell counts to the agglutinin titre, the content of agglutinin in antityphoid-inoculated men did not appear to influence appreciably the polynuclear or the lymphocyte proportions; nor did it affect the differential percentages in the paratyphoid A and B convalescents.

In convalescents, in typhoid after the sixth week there was a relative mononuclear increase and a polynuclear decrease, persisting for a considerable period. The same was true in paratyphoid A cases from France; but in those from the Mediterranean the counts were practically normal. In counts made after the Schilling-Torgau method in a number of typhoid and paratyphoid (A and B) convalescents, there were normal amounts of basophilic cells and absence of myelocytes and metamyelocytes. The rod-shaped polynuclears were within average limits, save in one case of paratyphoid B. The eosinophilous cells were, on the whole, just above the usual percentage. The polynuclear content was lowered up to the thirteenth week—in one case up to the twenty-sixth week—and the lymphocytes continued their high percentages during the same period.

The authors remark that they did not find the distinct eosinophilia which they expected to find, so that this feature does not seem to offer much aid in the differentiation of an inoculation and an infective agglutinin when only one agglutinin is present in the blood. As regards other types of cells, so far as they were able to glean, it seems probable that when the agglutinin present is due to inoculations, the blood films will yield practically normal figures, while in the case of an infective agglutinin the typical leucocytosis or polynuclear leucopenia associated with the causal organism will be found.

They further state that their investigations suggest the supposition that the cells which react to dead typhoid and paratyphoid bacilli may prove to be of a different order from those which act upon living infective typhoidal organisms. Also that there are differences in counts between pure typhoids and paratyphoids and those in which these diseases co-exist with a protozoal infection. But the whole subject requires further elucidation.

Two years ago attention was drawn to Dreyer's standard method of using the *macroscopic agglutination test*. During the past year a number of papers on the subject have been published, amongst which we note especially those by R. Donald,[4] R. Donaldson and Barbara Clark,[5] P. N. Panton,[6] E. W. Ainley Walker,[7] T. T. O'Farrell,[8] G. S. Wilson,[9] G. Dreyer and A. C. Inman,[10] and R. P. Garrow.[11] Dreyer's method has been very widely used, and is accepted as the best by most observers; but of the authors mentioned above, Donald, Panton, and Garrow point out that it is not without fallacies, and in their papers they state what these are. The questions discussed in these papers are of interest primarily to the bacteriologist; but as serum tests play in these days so large a part in the diagnosis of disease of the entire group, their solution is of importance to the clinician. It is a question whether the bacteriologist does not often work too much apart from the clinician, and does not set too high a value on his share in the diagnosis.

A useful agglutinometer, by which the macroscopic method can be quickly carried out, is described by R. P. Garrow,[12] who states that is an elaboration of a method first used by Bass and Watkins.[13]

A new clinical aid in the diagnosis of fevers of the enteric group has been introduced by H. F. Marris.[14] It is well known that atropine increases the rate of the heart by some 20 to 40 beats per minute. Marris found that the rate of a relatively slowly beating heart in the three forms of the enteric group was hardly accelerated at all by the injection of $\frac{1}{33}$ gr. of **Atropine Sulphate** hypodermically. He states, as a result of a study of a number of cases, that, as an arbitrary rule, an increase of the pulse-rate by about 20 or more beats a minute after atropine may be accepted as an indication that the patient is probably not suffering from typhoid or paratyphoid. Should the pulse-rate increase only 10 beats or less the reaction is suggestive of an infection by one of these diseases. Readings giving a difference of more than 10 and less than 20 beats a minute are uncertain in their interpretation, and necessitate further observations a day or so later. The reaction is to be observed most constantly during the second week of the disease. As in advancing years the heart responds less readily to atropine, in patients over fifty the test is less valuable. Persons who are the subjects of cardiosclerosis also fail to respond to atropine. Nor is the test available when the heart's action is rapid and irregular. The reaction quickly appears in persons who have recently been inoculated against enteric, and remains present (according to observations carried out in six cases) for about ten weeks.

Marris further noted that in those who were suffering from enteric there was a remarkable tolerance to atropine, and that the other effects (thirst, dilatation of the pupils, etc.) are apparently in abeyance.

Treatment.—Nolf[15] states that he has obtained good results in a few cases of typhoid and paratyphoid fever by intramuscular and intravenous injections of **Peptone.** The amount injected at one time should not as a rule exceed 10 c.c. of a 5 per cent solution, to be repeated daily during the next few days. In robust patients a larger dose may be given. When injected into a muscle, the gluteal region is usually chosen. Nolf used this remedy in the first instance to check intestinal hæmorrhage, but he found that, in his opinion, it exercised a favourable influence over the course of the disease. In some cases of intravenous injection there was shivering and a rise of temperature immediately after the injection, quickly followed by a rapid fall of temperature and profuse perspiration. Then the temperature rose again after a few hours, but it did not attain so great a height as before, and slowly fell again in the course of a few days. In other cases there was no very sudden fall, but a more gradual decline. Besides the effect on the temperature, other symptoms were relieved. The intravenous injections should be given slowly, at the rate of 5 c.c. per minute; if too quickly, symptoms resembling anaphylactic shock may arise. The rate of the pulse should be observed during injection; if it goes up quickly, injection should be stopped. This is especially necessary in unknown preparations of peptone, because some of these are more prone than others to give rise to unfavourable

symptoms. Nolf found also that this mode of treatment was very beneficial in the reduction of meteorism.

The value of **Colloidal Gold** in the treatment of typhoid and paratyphoid fevers is discussed by Marcel Labbé and Moussard,[16] and by Salomon.[17] The two first writers employed the intravenous method. They usually began the treatment with daily injections of 1 c.c.; then, having carefully estimated the degree of the resulting reaction and the effect obtained, they repeated the dose or else increased it to 2 c.c. If there was no modification of the thermometric curve, the injections were repeated daily for four to six days; then they were discontinued for two or three days, after which they were resumed. There are two effects to be noted after an injection—the immediate and the consecutive. The immediate consists of the following: violent rigors half an hour after injection; these last from half an hour to an hour; then a hot stage with profuse sweating; the temperature rises considerably. Then follows, after a few hours, a fall of temperature, which attains its maximum in four to seven hours; the pulse-rate follows the temperature. The total duration of the immediate reaction is about twelve hours; its intensity varies considerably in different patients. The consecutive reaction is to be observed on the day following the injection. There is a lowering of the temperature, diuresis, a sedative effect on nervous symptoms, and an improvement in the general condition. The duration of the attack is shortened, but improvement is gradual and not sudden.

There are certain inconveniences in, and contra-indications to, the use of this remedy. The immediate reaction is not infrequently very severe and unpleasant. It is inadvisable to use the gold in cases of cardiac failure, or when the heart is affected, or in cases of prostration, intestinal hæmorrhage, or peritonitis. It is largely in consequence of these contra-indications that Salomon prefers intramuscular injections. He advocates doses of 2 to 4 c.c., repeated daily till a good effect is noticed; this is not to be looked for so early as when the intravenous method is used. Salomon tried the drug in 141 cases; Labbé and Moussard do not state how many patients they treated in this way. Salomon gives reference to a number of papers on the subject.

An interesting paper on the *abortive treatment* of typhoid fever has recently been published by A. Maute (Fez).[17] He employed an emulsion of a certain strain of **Typhoid Bacilli** in doses of 100 to 500 million bacilli. Of 22 cases treated, only 1 died, and that one from peritonitis due to perforating cholecystitis. In 19 of the cases a rapid fall of temperature followed the first injection, the normal being reached within twenty-four hours. In 12 of these cases the temperature did not go up again. In the remainder there was a progressive rise; but a second or third injection brought the temperature down permanently in these cases. A general reaction (rigor, etc.) is to be noted in some, but it is not anything like so severe as that seen after the intravenous administration of colloidal gold.

Further experience has strengthened the case for the **High-calory Diet** in typhoid fever, a subject which has been dealt with in previous numbers of the ANNUAL, and upon which valuable reports have recently been published by D. Roberts[18] and Warren Coleman.[19] The latter writer contrasts the results of treatment in 444 consecutive cases at the Bellevue Hospital, of which half are placed on the high-calory diet, and the other half on milk. The high-calory cases did much better in every way than the others, their case mortality being 8·1 per cent as against 17·6, their complication rate being lower, and their recovery quicker. There can be little, if any, doubt that this method of feeding typhoid cases is a great improvement on the exclusive, or nearly exclusive, milk diet.

PROPHYLAXIS.—Noel Fiessinger[20] states that there are certain contra-indications to antityphoid vaccination, and he divides them into three groups: (1) External contra-indications: A state of fatigue; the person to be vaccinated should not have been subjected recently to hard work, nor should he be subjected to it for at least two days after vaccination. (2) Physiological contra-indications: In persons over forty, or with unduly high blood-pressure; at any age, persons who have been over-wrought or are emaciated. (3) Pathological contra-indications: All acute or chronic infections running their course; syphilis during primary and secondary stages; tuberculous disease (especially pulmonary); albuminuria and nephritis; diabetes; arteriosclerosis; hepatic cirrhosis; organic nervous diseases; chronic drunkenness with tremor. If any person has had a grave reaction after a first injection, he should not be re-injected (p. 15).

Vaccine therapy in cases of osteomyelitis secondary to typhoid (p. 34).

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1916, ii, 1493; [2]*Quart. Jour. Med.* 1917, Jan., i; [3]*Lancet*, 1916, ii, 514; [4]*Lancet*, 1916, ii, 423; [5]*Ibid.* 546; [6]*Ibid.* 750; [7]*Ibid.* 552, and 1917, April, 14; [8]*Lancet*, 1916, ii, 970; [9]*Ibid.* 1917, i, 263; [10]*Ibid.* 365; [11]*Ibid.* 1917, ii, 112; [12]*Lancet*, 1917, i, 262; [13]*Archives of Intern. Med.* 1910, Dec. 15; [14]*Lancet*, 1916, ii, 717; [15]*Archives Méd. Belges*, 1917, No. 9, Feb. 7, 97; [16]*Med. Press and Circ.* 1916, 206; *Presse Méd.* 1916, Oct., 437; [17]*Ibid.* 1917, June, 361; [18]*N. Y. Med. Jour.* 1917, i, 169; [19]*Jour. Amer. Med. Assoc.* 1917, ii, 329; [20]*Med. Press and Circ.* 1917, Jan., 48.

TYPHUS FEVER.

E. W. Goodall, M.D.

ETIOLOGY.—In 1909 Nicolle established the fact that the virus of typhus fever was contained in the blood. This he did by successfully infecting monkeys by means of injections of the blood of human patients. Since that time much research has been devoted to ascertaining the exact nature of the infecting agent and the modes of its conveyance from one person to another under natural conditions. The work has been carried out in Mexico (where the disease is epidemic under the name of 'tarbardillo'); in New York, amongst endemic sporadic cases; and especially in Russia and the Balkans, in the severe epidemics which arose shortly after the outbreak of

the great war. The results of this work may be very briefly summarized as follows :—

First, as regards the nature of the virus, it was shown in 1911 that the virus was not a filter-passer, and the presumption therefore was that it was a living organism visible by the aid of a microscope. Even before 1911, Rabinowitsch, in 1909, had isolated from typhus blood a cocco-bacillus, which he claimed was the causal agent. Since 1911 several observers have isolated organisms for which the same claims have been advanced, and these organisms in some characteristics have resembled, in others differed from, one another. But the results of many experiments lead to the conclusion that there were only two organisms on behalf of which valid claims could be advanced. One of these was a minute round or oval body, described by Heglar and Prowazek as occurring in the polymorphonuclear neutrophile leucocytes of typhus patients, which stained an intense carmine colour with Giemsa's method; the other was an anaerobic pleomorphic bacillus isolated from the blood by Plotz, Olitsky, and Baehr in 1915. While the latter organism is undoubtedly a bacterium, the former was for some time regarded as being a protozoon, and was indeed called by da Rocha-Lima, who found what was believed by Prowazek to be the same organism in infected lice, *Rickettsia prowazeki*. Recently, however, da Rocha-Lima has come to the conclusion that this organism is not, after all, protozoic, but bacterial, and he has named it *Bacillus prowazeki*. It is impossible within the limits of this article to discuss the claims of these two organisms to be the infecting agent of typhus. The reader is referred for details to two critical papers, one by Olitsky, Denzer, and Husk,[1] the other by Muriel Robertson,[2] in both of which many references will be found. Miss Robertson evidently is in favour of Plotz's bacillus; but in a discussion on her paper at the Royal Society of Medicine, on May 25, 1917, one of the speakers, Foulerton, made out a good case for Prowazek's body; and it is clear that each of these critics was of the opinion that the two organisms differed from one another. Olitsky, Denzer, and Husk, however, in the paper just referred to, came to the conclusion that essential differences between Plotz's *Bacillus typhi-exanthematici* and the organism described by Prowazek and da Rocha-Lima do not exist, and that the two organisms are really one and the same. This conclusion has been arrived at very largely from a study of the micro-organisms as they are found in infected lice. It can hardly be stated with truth, however, that up to the present the causal agent of typhus has been definitely ascertained, though the evidence is in favour of the *Bacillus typhi-exanthematici*.

The second problem is the mode of transmission of typhus naturally amongst human beings. It is an established fact that the virus is conveyed by lice. The evidence by which this fact has been established has been twofold: the results of experiments on animals, and the results of prophylactic measures planned and carried out on the assumption that the louse is the medium of infection. It was

Nicolle again who, in 1909, succeeded in infecting monkeys by submitting them to the bites of lice that had been fed on typhus patients. Later, Ricketts and Wilder brought forward evidence which went to show, though it can hardly be said to have definitely proved, that monkeys could be immunized against infection, by causing them to be bitten by infected lice. The same remark may be made of the experiments on producing immunity in monkeys by injecting into them the intestinal contents of infected lice. Their evidence, as well as that of other observers, is not conclusive, because they have not taken sufficiently into consideration the fact that a certain proportion of monkeys are naturally immune to typhus. Da Rocha-Lima produced typhus in guinea-pigs by injection of the contents of infected lice; and he kept their virus active during its passage through ten guinea-pigs. An eleventh passage was then made from the guinea-pig to a monkey, and the latter animal was infected with typhus. Typhus cannot be produced in guinea-pigs by injection of the contents of uninfected lice. Nicolle and Blaizot kept two strains of typhus virus active for two years by passage through monkeys and guinea-pigs.

According to Nicolle (quoted by Foulerton), a prison warder infected two healthy prisoners by causing them to be bitten by lice taken from another prisoner who was suffering from typhus.

Da Rocha-Lima found in lice from typhus patients large numbers of bodies which stained a crimson-red with Giemsa's stain. According to Prowazek, these bodies are the same as those obtained by him from the blood of typhus patients. Very rarely are these bodies found in non-infected lice. They occur in the cells of the gastro-intestinal tract and in the body-juice of the insect, and are not found in the excreta. As has been stated above, Olitsky, Denzer, and Husk are of the opinion that Prowazek's organism is identical with the *B. typhi-exanthematici* of Plotz. There are reasons for believing that the causal agent of typhus undergoes certain changes in the louse. Nicolle states that a louse which has fed on a typhus patient is not infectious, when made to bite an animal, before the seventh or after the tenth days after its removal from the typhus patient. Other observers make the limits of infectivity of the insect a little longer than four days.

Certain experimenters believe they have proved that the infection of typhus can be transmitted by an infected louse to its eggs (the nits); but the evidence in favour of this statement is not conclusive.

As regards the evidence from prophylactic measures, the experience of various hospital units in the Balkans and elsewhere (*see* MEDICAL ANNUAL, 1917, p. 542) goes to show most strongly that measures taken to prevent the spread of body-lice from typhus patients to healthy persons will protect the latter from an attack of the disease.

While it is almost always the body-louse which is the medium of transmission of the virus, it is possible that occasionally head-lice and bugs may act as conveying agents. And just as plague—a disease which, in the vast majority of instances, is conveyed from infected

rats by fleas to the human subject—may very occasionally be directly transmitted from the sick to the healthy by an excretion—in the pneumonic form from the lungs—so it must not be lost sight of that not impossibly may typhus also be spread by other means than insects.

Typhus fever is most prevalent during the winter season ; that is to say, during the months when the cold leads people, and especially the poorer classes, to keep indoors and herd together for the sake of warmth, to wear more clothing than in the warm weather and to change it less frequently, and also to wash less frequently. Add to these common conditions the hardships brought about by the terrible concomitants of a great war, hardships which in some countries affect the civil population equally with, if not to a more severe degree than, the armies in the field, and it is not surprising that lousiness, and therefore typhus fever, are rampant.

Prophylaxis.—Encouraging results from the use of a **Vaccine** of *B. typhi-exanthematicis* as a prophylactic against typhus fever have been briefly recorded by Plotz, Olitsky, and Baehr.[3] Their work was carried out in Serbia, Bulgaria, Volhynia, and Galicia during various typhus epidemics in the winter of 1915–16. The vaccine consisted of a suspension of fifteen strains of the above-named bacillus in physiological sodium-chloride solution which had been subjected to a temperature of from 58° to 60° C. (136·4° to 140° F.) for half an hour to an hour. The suspension was diluted so that each c.c. contained about two billion bacilli, and 0·5 per cent phenol or tricresol was added. Three injections, consisting of 0·5, 1, and 1 c.c. respectively, were given at five- or six-day intervals. As the supply of vaccine was limited, its use was restricted to those persons who were most exposed to the danger of infection—orderlies and members of hospital staffs in attendance on typhus patients—and men whose duty it was to remove the clothing and bathe and shave patients, or who were concerned in the sanitation of towns and villages where typhus was epidemic.

In all, 5251 men were vaccinated in Bulgarian military hospitals and sanitation units : and amongst them only three cases of typhus occurred. The authors were not able to obtain exact details concerning the occurrence of typhus amongst the staffs of hospitals and sanitation units where vaccination was not carried out ; for military reasons the numbers were not published. But they state the number of cases occurring amongst the unvaccinated was many times greater than amongst the vaccinated. " For example, in the town of Uskub, in which there were five military hospitals, complete vaccination was carried out in four. In these four hospitals not one house infection occurred during the course of the epidemic. In the hospital in which vaccination was not carried out, thirty-four house infections occurred during the same period of time.

" In the town of Gornijumier, in Bulgaria, many cases occurred among the personnel of the hospitals before the vaccinations were instituted. During the course of the vaccinations (ten days) four

more cases developed among them. After completion of the vaccination no further house infections occurred, though the hospitals had over 300 admissions in the subsequent three weeks." A very similar experience was met with in the town of Radomir, in Bulgaria. In Volhynia (Russia) the vaccine was used on 3169 persons in forty-six institutions. "Up to the end of May, 1916, there occurred three cases of typhus fever amongst the vaccinated. Among the non-vaccinated during the epidemic there were many times that number, though for reasons previously stated no statistics are available."

"In all, 8420 persons, members of 109 hospital, sanitation, and other units in Serbia, Bulgaria, and Volhynia, were vaccinated against typhus fever during the epidemic of 1915–16, an attempt being made to include in this number only the persons who were most exposed to the danger of infection. Of this number, six developed the disease during the four months of the epidemic."

Typhus cases began to appear in large numbers in the Balkans towards the end of January, 1916, and the maximum number was reached at the end of February, though the prevalence continued in various parts of the country till the middle of May. According to the writers there were about 3000 cases in the Bulgarian military hospitals, and probably many more in the civil population. The case mortality was about 11 per cent.

[Unfortunately the authors do not state what, if any, measures were adopted by the staff of the units who were vaccinated against typhus, to protect themselves against invasion of lice from the patients they handled. It has been found that the employment of such measures is highly efficient as a prophylactic. In any future reports on anti-typhus vaccination it should be reported whether or not other precautionary means were adopted.—E. W. G.]

Nicolle and Blaizot[4] report that they used an **Antitoxic Serum** in thirty-eight cases of typhus fever with apparently beneficial results, as there was only one death amongst these cases. The serum used was that of horses and donkeys which had been immunized against typhus by the frequent inoculation of an emulsion of the spleen or suprarenal capsules of guinea-pigs infected with typhus. Successful experiments with the serum on guinea-pigs were carried out before the method was applied to the human subject. The dose was 10 to 20 c.c. of the serum injected subcutaneously every day up to the stage of defervescence.

Garlic as a prophylactic (p. 15).

References.—[1]*Jour. Amer. Med. Assoc.* 1917, i, 1165; [2]*Proc. Roy. Soc. Med.* (*Epid. Sect.*), 1917, June, 95; [3]*Jour. Amer. Med. Assoc.* 1916, ii, 1597; [4]*Ann. de l'Inst. Pasteur*, 1916, 446 (abstr. *Lancet*, 1916, ii, 950).

ULCERS, VARICOSE. *W. I. de C. Wheeler, F.R.C.S.I.*

Skillern[1] states that there is no virtue in scarlet red and such-like ointments. The treatment depends upon: (1) Protection of the regenerating epithelial edge of the ulcer; (2) Drainage of the discharge from the ulcer; (3) Support of the venous channels from

PLATE LVI.

ULCUS MOLLE SERPIGINOSUM

E. Graham Little

without, thus neutralizing the baneful effects of chronic venous congestion. The rational treatment may therefore be summarized as the '**Rubber-tissue Dry-gauze-muslin Bandage Method.**' In selected cases he believes that the adhesive-plaster strapping method, with calomel applied as a dusting powder, effects a cure, and Unna's **Zinc Oxide Gelatin Paste** stocking serves as an admirable support for the venous channels. Homans[2] states that ulcers are best excised and skin-grafted at once.

References.—[1]*Surg. Gyn. and Obst.* (abstr.) 1916, June, 623; [2]*Ibid.*

ULCUS MOLLE SERPIGINOSUM. *E. Graham Little, M.D., F.R.C.P.*

This somewhat cumbrous title has been applied to a rare but important affection which is usually mistaken for syphilis even by expert observers, but which is due to the infection of soft sore, of which the bacillus of Ducrey is accepted as the cause. Graham Little[1] reports a remarkable case of this disease, the essential features of which may be thus described. There is a very constant history of the symptoms dating from a suppurating bubo, which has either burst or been opened, usually many years previously, and from the site of this original focus a very indolent ulceration has spread by continual peripheral enlargement, with healing at the central area, so that large portions of the skin of the thigh and abdomen may be involved. The ulceration spreads upwards and downwards from the bubo in the groin, and may persist for fifteen years or longer. It is more common for the ulceration to be unilateral, but where buboes have been present on both sides, the ulceration may also thus be bilateral. The curious distribution, the history of suppurating bubo following on soft sore, and the extreme chronicity, are the best differentiations from syphilitic ulcerations. The Wassermann reaction, which is negative, affords valuable help in diagnosis, and the complete failure to respond to antisyphilitic treatment should excite suspicion of the non-syphilitic nature of the ulceration. The bacillus of Ducrey may be found in the active ulcers, but cannot always be demonstrated. The disease is most intractable. It is more often than not the result of exotic infections, especially tropical. Graham Little found the application twice daily of **Collosol Argentum** to the ulcer highly effective in the case here recorded, of which a photograph is reproduced. (*Plate LVI.*)

Reference.—[1]*Proc. Roy. Soc. Med.* (*Derm. Sect.*), 1917, Oct.

UNCINARIASIS. (*See* Ankylostomiasis.)

Chenopodium Oil successfully employed in treatment (p. 11); and **Chloroform** (p. 12)

URETER, SURGERY OF. *J. W. Thomson Walker, M.B., F.R.C.S.*

A summary of all the published cases of *congenital anomalies* of the ureter, by Eisendrath[1] shows that, clinically, they belong to one of three classes: (1) Those (the majority) in which the condition remains latent throughout life, and is an accidental finding at the autopsy;

(2) Cases where the predominant symptoms are those of abdominal infection ; (3) Those in which disturbances of micturition are the principal symptom.

The examination of the urine is of little value. Ureterography and pyelography, and the other methods used in the diagnosis of ureteral strictures and of hydronephrosis, are all of the greatest value when the stricture is permeable. The treatment depends on the degree of constriction, the amount of damage to the kidneys, and whether infection is present or not. When infection is present, or the kidney is greatly damaged, nephrectomy is the rule ; otherwise a pyelo-urethroplasty or an implantation of the ureter into the bladder may be possible.

Buerger,[2] discussing *stenosis and stricture* of the ureter, restricts true stenosis or stricture to all types of permanent diminution of the calibre of the ureter that are not neoplastic, and includes spasmodic strictures, obstacles due to the presence of calculus, incrustation, malposition, kinks, toxins, compression by abdominal organs, neoplasms, and secondary infiltration with tumours. The author classifies cases of stenosis into congenital and acquired varieties. Most congenital stenoses are situated either at or very near the ureteropelvic junction, or at the lower end of the ureter. Stenosis of the ureteropelvic junction is usually a congenital aplasia. The uppermost portion of the ureter has the diameter of a small probe. When these cases come to operation, there is usually an enormous hydronephrosis. This condition must be differentiated from that in which there is an anomalous or high implantation of the ureter, with kinking, and also from that in which an aberrant mass brings about distribution and pressure, and prevents the escape of urine.

Congenital stenosis of the lower end of the ureter may be divided into : (1) Total aplasia of the lower end of the ureter, with complete absence of a portion of the ureter, without any appearance of a ureteric orifice in the bladder : (2) Atresia or aplasia of the lower end of the ureter, with distinct indication of the presence of an orifice ; (3) Congenital narrowing of the lower end of the ureter ; (4) Narrowing of the lower end of the ureter, with prolapse and cystic dilatation of the intravesical part or ureterocele.

Acquired stenosis of the ureter, if tuberculous inflammation is included, may be classified into : (1) Traumatic cases, usually post-operative : (2) Those due to inflammation, especially peri-urethral ; (3) Those associated with calculus ; (4) Cases dependent upon gonorrhœal inflammation.

Most of the traumatic post-operative strictures are traceable to previous ureterotomy for impacted calculus ; a few follow hysterectomy and implantation and re-implantation of the ureter after resection of the bladder.

Jackson[3] discusses some problems of *ureteral surgery in gynæcological operations*. Injuries to the ureter during nephrectomy, he concludes, are frequently overlooked at the time of the operation, and

the fact that the ureter is damaged is discovered some days later. Repair of the injured ureter is difficult, and the kidney may have to be sacrificed. It is, he thinks, better not to attempt repair of the ureter if there is serious doubt of success, and removal of the kidney would be better under these circumstances. The kidney should not be removed until it is proved that there is a sound second kidney. It is frequently better to ligature the ureter than to attempt an anastomosis. In ligaturing a ureter, the ligature should not be so tightly drawn as to cut through the walls of the tube. Two ligatures should be placed half an inch apart. When the ureter is tied, the urine is secreted by the kidney on this side, until the urinary pressure is equal to the blood-pressure in the kidney. Then the secretion ceases, and the urine changes its composition, the salts being absorbed and the fluid becoming watery.

Judd[4] describes the technique of *implantation of the ureter into the bladder*, after resection of the lower end of the tube. He records 17 operations for carcinoma of the bladder in which the ureter was so transplanted, with a mortality of 18 per cent. Five cases were known to be alive at the time of writing.

Baird, Scott, and Spencer[5] discuss *transplantation of the ureters into the intestines*. They transplanted the ureter into the pancreatic duct of a dog. Ascending infection travels up the ureter by the lymphatics, and may, they conclude, be prevented by transplanting the ureter into an opening simulating a normal intestinal opening. A valve action is not essential. The entire urinary output cannot be drained into the upper intestinal tract, as its absorption gives rise to toxic symptoms ending in death within twelve days.

Lewis[6] advises that attempts to dislodge a *calculus* impacted low down in the ureter should be made by cystoscopic methods before carrying out a suprapubic operation. Such measures consist in dilatation of the ureter with both flexible and metal dilators, incision of the ureteral meatus when necessary, application of ureteral forceps, and high-frequency electric current. When the stone is impacted higher up in the ureter, cystoscopic measures consist in the passage of a ureteral catheter, with the intent of dislodging the stone, the injection of liquid vaseline through the catheter, the passage of successive sizes of dilating bougies and metal dilators. In the cutting operation for ureteral calculus, the extraperitoneal incision is much preferred. Preliminary ureteral catheterization often facilitates the finding and identification of the ureter and stone.

Fowler[7] recommends the instillation of **Sulphate of Papaverine** into the ureter, as an aid to the expulsion of ureteric calculus. He records three cases in which this occurred, and suggests it might be used after any catheterization of the ureters to allay spasm and pain.

References.—[1]*Ann. Surg.* 1917, May, 552; [2]*N. Y. Med. Jour.* 1917, i, 826; [3]*Ibid.* 639; [4]*Surg. Gyn. and Obst.* 1917, June, 635; [5]*Ibid.* 1917, April, 482; [6]*Ibid.* 1917, June, 649; [7]*Ann. Surg.* 1917, May, 611.

URETHRA, SURGERY OF. *J. W. Thomson Walker, M.B., F.R.C.S.*

Hypospadias.—In an exhaustive article on hypospadias, Beck[1] gives an account of the different methods that are used to remedy this congenital defect, and describes the operation he practises. The best age at which to operate is from four to six years, and the finishing touches are made at the age of eight to ten. Sometimes four years is too early, but a good deal depends on the condition and general health of the patient. Operation need not be done on a puny, delicate child with other deformities. The boy should be in good health, and free from any other ailments such as adenoids, enlarged tonsils, or kidney and bladder troubles. Infection of the wound is a second cause of failure. Beck does not consider it necessary to divert the urine from the operation wound, but depends on accurate suture to prevent infiltration of the wound layers. He dislikes catgut, and uses horsehair as a suture material. The after-treatment should be carefully carried out by the surgeon himself. Cure is only complete when a perfect freely movable urethra, without angular deflection on erection, is obtained, and when there is no urethral stricture after some years.

In glandular hypospadias the urethral orifice is very small, and is on the ventral surface of the glans. Those cases seldom require operative treatment, but sometimes patients demand a cure. The best method is to form a cuff by dissection round the urethral opening, and draw this cuff through the centre of the glans (Hacker and Beck). The incision round the urethra is carried to a quarter of an inch, the skin is dissected close to the urethral opening, and the urethra itself dissected downward slightly. After drawing the cuff through the opening made in the centre of the glans, it is sutured to the glans with four or five horsehair stitches. The denuded area left under the penis is covered by transfixing the foreskin and bringing the glans through the opening. This bridge flap covers the bare area, and is sutured in position.

In the second degree of hypospadias, the urethral orifice lies about as far back as the scrotum, and the urethra is shortened, so that there is curvature during erection. The urethra is first separated from the under surface of the penis by a transverse incision, which opens out on raising the glans. This raw area is covered by a bridge flap of the foreskin. After three or four weeks, when there is solid union, a long incision is made on each side, from the urethral orifice forward, and the skin united over a rubber catheter. This is then covered by a flap of skin from the side. A fistula remains at the junction with the old urethra, and this is closed by freshening the edges.

Bevan[2] finds that the operation described by Beck shortens the under surface of the penis, and produces much scar tissue. He dissects out an oblong flap of skin from around the abnormal urethral opening, the lower part of the flap being longer than the upper. This flap is turned forwards in the form of a tube, and drawn through a tunnel bored in the glans. The defect left is covered by drawing together the skin from each side,

Diverticulum of the Urethra.—Englander[3] records two cases; one on the right side of the membranous urethra, and the other just anterior and to the left of the verumontanum. Diagnosis is usually easy, as there is a swelling in the ventral surface of the urethra during micturition. The urethroscope may reveal the opening of the diverticulum. There is usually dribbling of urine, straining, or complete obstruction. When infected, a diverticulum will cause a persistent urethral discharge. Treatment is by excision.

Follicular Urethritis.—Kaufman[4] includes under this term cases of chronic or subacute urethritis in which the glands of Littré and the lacunæ of Morgagni are involved. There may be acute or chronic inflammation or congestion. The subacute type is characterized by relapsing urethritis. There is nothing to distinguish the chronic form from any chronic urethritis. The diagnosis is made with the urethroscope. **Fulguration** gives good results in the treatment of subacute inflammatory folliculitis. Chronic inflammatory folliculitis is treated in conjunction with other lesions which may be present in the urethra. **Dilatation** of the urethra and **Massage** of the follicles are the most valuable methods; fulguration of the follicles is the next most useful. The entire follicle and its duct must be destroyed in order to secure the best result. A special electrode is used for the purpose.

Stern[5] describes an apparatus by means of which he applies a constant stream of hot water, under pressure, to *strictures* of the urethra. The heat tolerated by most patients is 120°, and rarely 130° can be exceeded. The treatment should be applied for at least twenty to thirty minutes. The beneficial effect is the result of the hyperæmia produced.

References.—[1]*Surg. Gyn. and Obst.* 1917, May, 511; [2]*Jour. Amer. Med. Assoc.* 1917, i, 1032; [3]*Ibid.* 351; [4]*N. Y. Med. Jour.* 1917, i, 549; [5]*Ibid.* 302.

URINARY SURGERY.

The value of **X-rays** in diagnosis (p. 47).

UTERUS, AFFECTIONS OF. *W. E. Fothergill, M.D.*

Retroversion.—There is the usual crop of papers on this subject. One writer collected 131 of these published during 1913 alone. Another writer, in Brussels, described over 80 operations which have been devised for the correction of backward displacements. In 1895 Theilhaber said that the symptoms usually associated with retroversion were due to other causes of which the displacement was an accidental accompaniment. J. T. Williams[1] quotes others who agree with Theilhaber as follows: J. Montgomery Baldy: "Retrodisplacements of the uterus are mostly coincident with other lesions, and where such is the case the symptoms almost universally come from the associated disease." J. Wesley Bovee: "I am convinced that uncomplicated uterine retroversion has no symptoms." Howard A. Kelly, in 13,600 gynæcological cases at the Johns Hopkins Hospital, found 1886 retroflexions, of which 415 were uncomplicated. W. J. Mayo: "While the

normal position of the uterus in the majority of women, perhaps 75 per cent, is more nearly anterior than posterior, it will be acknowledged that in at least 25 per cent, and at various ages, retroposition exists." Schroeder examined 145 medical patients complaining of no pelvic symptoms, and found the uterus in anterior position in 75 per cent and retroverted in 25 per cent. Williams, in 1000 consecutive gynæcological patients admitted to the Boston City Hospital during the first six months of 1914, found 306, or approximately 30 per cent, with retroversion. Out of this number, only 13 were operated upon for an uncomplicated retroversion.

Williams asks, Are there retroversions which give symptoms, and those which do not? If so, can the two types be recognized? His answer is that: (1) Retroversions of the uterus may be divided into three classes: (*a*) Inflammatory, in which the uterus is displaced by a pus mass and the fundus afterwards drawn backward by adhesions; (*b*) Congenital, in which the retroversion may be said to be the normal position of the uterus for that individual; (*c*) Acquired, as the result of injury or relaxation consequent on childbirth in which the retroversion is not a condition *per se*, but a part of the general process of prolapse. (2) In retroversions of the first class, treatment is directed primarily to the inflammatory process, and displacement is corrected only incidentally. (3) Congenital retroversions are usually symptomless and require no treatment. (4) Retroversions acquired as the result of parturition should be considered as a step in prolapse of the uterus, and the downward as well as the backward displacement corrected.—[But this is too simple, for plenty of acquired retroversions are not a step in prolapse, and plenty of congenital retroversions are accompanied, sooner or later, by symptoms.—W. E. F.]

E. Reynolds[2] writes on an expedient for the cure of some retroversions. He refers to child-bearing women, in whom retroversion has been 'acquired' after a confinement, owing to the failure of involution of the muscular structures in the subperitoneal pelvic tissue which should hold the cervix back. The structures which support the uterus are all muscular. They evolute (increase in size and lose rigidity) with the uterus during pregnancy; they involute (shorten and resume firmness) with the uterus during the puerperium. If these structures are allowed to involute during the puerperium, with the uterus held by its own weight and by the intra-abdominal pressures in a retroverted or retroflexed position, they of necessity possess at the end of their involution the degree of length and relaxation which results in an absence of tension, i.e., in a comfortable adjustment of tensions, with the uterus in this abnormal position. They are no longer capable of sustaining the uterus in its proper position. They remain relaxed and subinvoluted with the uterus until the organ is replaced and raised by a pessary. A universal experience has shown that they do not then undergo sufficient resumption of activity to enable them to perform their supporting functions effectively.

All that is necessary to secure effective puerperal involution of the

supporting structures, and a cure of the retroversion, is so to arrange the next puerperium that the supporting structures undergo involution, and complete involution, while the uterus is held in a forward position. Under these circumstances the supporting structures will almost invariably shorten and resume firmness to a degree which will hold the uterus permanently in a normal position. At a period in the puerperium at which the uterus is too large to be capable of retroverting, i.e., between the tenth and fifteenth day of the puerperium, the uterus should be thrown into strong anteversion bimanually, and a carefully fitted pessary should be made to hold it there. In this position of the uterus, involution is usually rapid. In most cases it will be found that within a week the original pessary will have become too large for the contracting vagina. A second and smaller, but equally well fitting, pessary should then be adjusted. This will usually need to be replaced by one still smaller in from ten days to a fortnight.

A. Goldspohn,[3] writing on a modified Gilliam operation, says that aside from mechanically interfering with the bladder and rectum, the potential pathological factor in retroversion and retroflexion of the uterus is the involved embarrassment of the venous circulation in the parts. This results from the inevitable torsion of the broad ligaments in which most of the veins are suspended. W. Waldeyer says: The broad ligament of each side is a quadrangular fold of peritoneum, somewhat rounded off, the width of which nearly equals its length; it extends in an approximately horizontal direction or at right angles to the perpendicular axis of the body, and carries between its blades most of the blood-vessels and nerves that supply the uterus. When such a fold, not over 7 to 8 cm. in length and nearly the same width, is twisted from one-half to three-fourths of a turn under continued tension, it is very evident that veins in its embrace will be constricted at some points, and will suffer from traction, if not from torsion, enough to impede the venous current. Thus a constant passive hyperæmia, and sometimes even a varicose condition, is induced, with trophic changes which result in catarrhal conditions of the mucous membranes, in follicular degeneration of ovaries, and in a generally diminished capacity to withstand infection.

[No formula can be set forth by which the inexperienced gynæcologist can decide whether any particular case in which the physical sign of retroversion is observed does or does not demand operative treatment. But the following qualified statements may be set down for what they are worth :—

1. When doing a conservative operation for the results of old pelvic infection, an adherent retroverted uterus should be freed from its adhesions and secured in a position of anteversion by some simple and harmless surgical device.

2. When it is thought necessary to operate upon a retroversion, either congenital or acquired, which is not complicated by, or a step in, any variety of genital prolapse, a Webster's sling or some form

of Gilliam's operation will be found satisfactory, and preferable to any form of ventrofixation, ventrosuspension, or Adams's operation.

3. When retroversion is a step in prolapse, it is accompanied by cystocele, or elongation of the cervix, or both. There is also room to work from below. Here there is no excuse for any abdominal operation, for all the varieties of genital prolapse are easily cured by appropriate plastic vaginal operations. — (*See* MEDICAL ANNUAL, 1917, "Genital Prolapse," p. 248.)—W. E. F.]

Myoma.—W. J. Mayo[4] writes with special reference to **Myomectomy.** He mentions that it has been shown that 12 per cent of white and 30 per cent of coloured women of 50 years of age have uterine myomata, and that only a small proportion of these have symptoms or require treatment. But the large majority of patients whose myomata can be felt through the abdominal wall, with or without symptoms, require operation. Diagnosis is more or less incorrect in about 5 per cent of the cases of myoma—a fact of great importance when the use of radium or *x* rays is to be considered. Mayo is not enthusiastic about these methods of treatment. Hysterectomy is still the operation of choice for all symptom-producing myomata. In all cases of erosion, cystic degeneration, or other disease of the cervix, the author removes the cervix with the body of the uterus, provided it can be done without unduly increasing the risk of the operation. Myomectomy has not been popular. It has been said to have a higher mortality than hysterectomy, and that subsequent operations are often required. Mayo has a mortality of only ·8 per cent, which is lower than that of hysterectomy; and only 5 out of 504 patients required subsequent hysterectomy. His myomectomy cases, however, were picked. The operation was generally done in patients under the age of 35. The cases in which operation is risky (degenerations, infections, hæmorrhages, etc.) occur at a later age. The operation is more difficult than hysterectomy. Mayo's 504 patients have had (24 of them) 38 living children since their operations. The author thinks myomectomy has not received the attention it deserves, in young and healthy women.

Carcinoma.—Numerous papers have appeared adding to the discussion on the **Radical Operation, Radium, X Rays,** and **Heat** in the treatment of uterine cancer. As yet no definite conclusion has been reached as to the values of these methods either absolutely or in relation to one another. (*See* MEDICAL ANNUAL, 1917, p. 556.) Those who have seriously and steadily performed the radical operation in suitable cases are able, as the years go on, to report an increasing number of cases living and free from recurrence five years and upwards after the date of operation. The primary mortality of the operation remains high.

The Uteroscope.—Heinberg[5] advises the use of the uteroscope for the exact diagnosis of intra-uterine conditions, and urges its advantages over the transperitoneal hysterotomy of some authors. A critical study of 27 cases in which hysterotomy was done for the

purpose of diagnosis by its most ardent advocate shows the following results: retained products of conception, 15; chronic hyperplastic endometritis, 6; benign polyp of the endometrium, 3; chorio-epithelioma, 2; early carcinoma of the fundus, 1. It is clear that this surgeon is not familiar with the diseases of women, but it does not follow that the uteroscope is necessary for the diagnosis of the above-mentioned conditions, Heinberg, however, states the advantages of the instrument as follows: (1) It affords a perfect view of the interior of the uterus without subjecting the patient to the dangers attendant upon invasion of the peritoneal cavity; (2) It may be performed quickly under nitrous-oxide-oxygen anæsthesia; (3) The patient experiences no more pain or discomfort than after an ordinary dilatation and curettage; (4) It affords a clear view of the *cervical canal* as well as of the uterine cavity; (5) The dilated cervical canal insures good post-operative drainage from the cavity of the uterus; (6) It will demonstrate that a very large proportion of cases of obscure intra-uterine disease are non-malignant and may be efficiently treated by the curette or placental forceps and thus avoid a maximum of cure for a minimum of disease.

Employment of **X-rays** and **Radium** therapy (p. 57).

References.—[1]*Boston Med. and Surg. Jour.* 1917, i, 558; [2]*Ibid.* 1916, i, 830; [3]*Amer. Jour. Obst.* 1917, i, 38; [4]*Jour. Amer. Med. Assoc.* 1917, i, 887; [5]*Amer. Jour. Obst.* 1917, ii, 216.

VACCINATION. *E. W. Goodall, M.D.*

A method of vaccination, which appears both to be efficacious and to have considerable advantages over ordinary methods, is described by W. H. Hill,[1] of London, Canada. The sleeve of the person who is to be vaccinated is rolled up, and the skin of the selected site is successively washed with soap and water, rectified spirits, and ether. The vaccine lymph is then expelled from the capillary tube on to the arm at three or four points, making a triangle or square, leaving not less than two inches between the points. With an ordinary sewing needle, sterilized, six tiny punctures, drawing no blood, are made through each drop of lymph, each set of six occupying a space not more than one-eighth of an inch square. The needle is held almost parallel with the surface. Not over one-thousandth of an inch occupies the epithelial layer. The lymph is then wiped off the skin and the sleeve is pulled down. Typical lesions usually result in persons who have not been previously vaccinated. No after-treatment (shields, bandages, etc.) is required, for if left alone the pustules dry up, to form scabs which separate without leaving an ulcer.

Amongst the advantages claimed for this method are, that there is no waiting for the vaccination sites to dry; there are no bad arms, because there is no removal of the epidermis; and that where a large number of persons are to be vaccinated (e.g., as in the Army) the process can be carried out very rapidly with the aid of orderlies.

Reference.—[1]*Brit. Med. Jour.* 1917, i, 189.

VACCINIA. *Frederick Langmead, M.D., F.R.C.P.*

To combat the assertion that vaccination may gravely prejudice the child's future growth and diminish its resistance to disease, it has been necessary to obtain some evidence by observing the effects of other infectious diseases in vaccinated, and comparing them with those in unvaccinated, children. With the object of elucidating the point, Parlane Kinloch[1] has kept a record of the presence or absence of vaccination scars on all children under five years of age admitted to the City of Glasgow Fever Hospital during the years 1910–13, and has published tables showing the incidence of death and of complications among the vaccinated and unvaccinated sufferers from scarlet fever, measles, diphtheria, and whooping-cough. The number of cases of erysipelas, bronchopneumonia, and enteric fever was so small that, although tables were prepared, the totals only were published. The figures relate to 3804 cases of infectious disease, of which 3058 occurred in vaccinated and 746 in unvaccinated children. They show repeatedly a greater incidence of complications and death among the unvaccinated. It is not contended that vaccinia increases the resistance of the body to disease in general, and it is recognized that the results of the inquiry depend in part upon the inclusion among the unvaccinated of weakly children exempted from vaccination on purely medical grounds. On the other hand, the healthy children of conscientious objectors to vaccination appear in the unvaccinated group. Whatever be the explanation of the figures submitted, they afford no evidence that vaccinia has a prejudicial effect on a child's future well-being as judged by its response to subsequent infection.

Reference.—[1]*Lancet*, 1917, i, 993.

VAGINITIS. *W. E. Fothergill, M.D.*

F. P. Gill[1] describes vaginitis as the *bête noir* of 'out-patient' gynæcologists, and states that the condition can be cured by the routine use of sulphur administered in the form of an ointment;—

℞ Sulph. Præcip. ℥ij | Parallini Mollis (B.P.) ℥iv
M. Fiat unguentum.

A piece of lint, 2 in. wide and 12 in. long, is thickly coated on one side with the ointment. The lint is then folded in the middle of its length over the top of a pencil or introducer eight inches long, the ointment being outside. The lint is then introduced up the vaginal canal, right up between the cervix and the posterior fornix. The pencil is then withdrawn, leaving the lint *in situ*, and in close contact with the anterior and posterior walls of the vagina, which retain it in its position, any extruding ends of the lint being simply tucked up inside the vaginal orifice. This is done night and morning, preceded by a good vaginal douching of warm water and soap, before the fresh piece of lint is introduced. Sulphuretted hydrogen is generated *in situ*, and penetrates deeply into the affected tissues in a nascent form. It is a powerful germicide. The application is

soothing and grateful to the patient, especially in the more inflammatory and acute cases. The ordinary treatment is very unsatisfactory, and the above method appears to deserve extended trial.

G. Gellhorn[2] writes on *senile adhesive processes in the genital tract.* He says that 'senile vaginitis' is a misnomer. There is no inflammation at work as the term would indicate. The multiple squamous epithelium of the vagina becomes thinner in old age, even as the epidermis does. The superficial layers become hornified and are cast off, and the basal layer loses to a large extent its reproductive faculty. The connective-tissue papillæ with their central blood-vessels now become visible through the thinned, transparent epithelium. Hence the dot-like reddening of the vagina. A thin, colourless, sticky, and acrid fluid exudes from the exposed capillaries. Neighbouring parts of the vagina are thus rendered raw and may easily conglutinate. Moreover, age changes take place in the elastic tissue of the vaginal wall. The delicate, wavy, elastic fibres which are present in large quantities in the vaginal wall, become thick, straight, and unyielding. Thereby more or less complete annular constrictions occur in the wall, the lumen of the vaginal tube is narrowed, opposing parts are brought into constant apposition and readily conglutinate to one another. These connections may in course of time become very firm, and constitute dense bridges, bands, or membranes which eventually may completely occlude the vagina.

Gellhorn's description may be correct for some cases, but in most there is a septic infection superadded to the atrophic changes. The discharge is purulent in one phase or another of most cases. Pyometra is much commoner in old women than it is supposed to be, and it is brought about by a condition for which the term 'senile vaginitis' is a correct name. The primary condition is senile vulvitis of septic origin. The infection spreads up the vagina, which is atrophic, as Gellhorn describes, and is not protected by abundant acid secretion, as it is in younger women. If the infection spreads to the uterus, and if this is followed by occlusion of the cervical canal and the upper portion of the vagina, the conditions for the production of pyometra are supplied.

References.—[1]*Pract.* 1917, ii, 85 ; [2]*Surg. Gyn. and Obst.* 1917, i, 27.

VASCULAR SURGERY. (*See* Heart, Etc.)

VERTIGO. *John S. Fraser, M.B., F.R.C.S.*

For many centuries past the individual has been regarded as possessing only five special senses : sight, hearing, taste, smell, and touch. Lewis Fisher[1] states that a great advance was made when the sixth sense—the so-called 'muscle-joint-and-splanchnic sense' came to be recognized. Recent studies of the internal ear, however, show that there is still another (seventh) special sense, the so-called 'static sense.' This static sense has an 'end-organ' for receiving stimuli, a conducting nerve for conveying sensations, and definite nerve tracts

leading to brain centres where the stimuli are interpreted and translated into equilibration. The static portion of the internal ear is the 'end-organ' of this seventh 'static' sense. The ear is not the only organ concerned with the equilibratory function. Equilibrium is maintained because of an harmonious co-operation of *three* senses—sight, muscle, and static sense. Just as affections of the cochlea are manifested by impaired hearing and tinnitus, so the disturbance of the static portion of the internal ear may cause dizziness, staggering, nausea, and vomiting; but whereas tinnitus and deafness at once point to the ear, the general practitioner, when confronted with dizziness and nausea, may not suspect the ear as the source of the trouble. Vertigo from whatever cause can result only from an affection of the vestibular apparatus directly, so that under such circumstances the condition of the ear and its associated pathways should be thoroughly investigated.

Vertigo from disease results wherever there is an interference with the perfect balance between the special static organs on each side. Both ears act in unison, and are constantly sending out an equal flow of impulses to the musculature of the body, ensuring perfect equilibration. When disease destroys the apparatus on one side, or produces an irritation, there results an inequality of tonic influence as between the two sides, with a resulting vertigo. When disease in remote organs causes vertigo, it is only because of a definite influence on the ear mechanism. Vertigo may be caused by : (1) Lesions within the internal ear—inflammatory effusions or hæmorrhage, degenerative changes, trauma; (2) Toxæmias affecting the ear or other portion of the vestibular apparatus, e.g., constipation, alcoholism, lead poisoning, nephritis, and syphilis; (3) Lesions within the brain itself, such as tumour, hæmorrhage, thrombus, abscess, gumma, neuritis, or multiple sclerosis.

If stimulation of the internal ear fails to produce any response at all, or when *all* the responses are affected similarly, we conclude that the lesion is either in the labyrinth itself, or in the eighth nerve. If, on the other hand, stimulation produces one good reaction, while other responses are absent or markedly impaired, it is obvious that the internal ear itself and the eighth nerve are intact, and that the lesion is located centrally—that is, after the eighth nerve has divided on entering the brain-stem. It not infrequently happens that patients complaining of vertigo show normal reactions to ear stimulation. We are then dealing with a condition in which the vestibular apparatus is irritated at some point, and a search should be made for such a source of irritation. This may be a focus of infection in the tonsils, teeth, stomach, kidneys, etc.

Ramsay Hunt[2] states that the vestibular nerve from the utricle, saccule, and semicircular canals passes through the ganglion of Scarpa in the internal auditory meatus. From here the sensory impressions flow to the primary vestibular nuclei in the medulla oblongata, of which the more important are the nucleus of Deiters,

nucleus triangularis, nucleus of Bechterew, nucleus of Staderini, and nucleus vestibularis descendens. From these primary nuclei the labyrinthine impulses are diffused: (1) To the ocular nuclei on both sides, by way of the posterior longitudinal bundle (through this mechanism vestibular nystagmus is produced); (2) To the vermis and cerebellar cortex; (3) To the anterior-horn cells of the spinal cord through the vestibulo-spinal tract (these connections produce the forced movements, disequilibration, and the alterations of muscle tonus of labyrinthine origin); (4) To the nucleus of origin of the vagus nerve (which explains the nausea, vomiting, dyspnœa, and circulatory changes); (5) Through the mid-brain and the optic thalamus to the cerebral cortex in the posterior portion of the parietal lobe (this communication is the basis for the existence of static consciousness, and explains the disorientation of a severe vertiginous seizure).

Ramon y Cajal has demonstrated that collaterals pass from the pyramidal tract fibres in the pons to the cerebellar cortex of the opposite side. These communications explain in part the occurrence of ataxia, forced movements, and alterations in muscle tonus which are observed in labyrinthine disturbances. They also explain the reaction movements of the head, trunk, and extremities after the caloric test.

Vertigo, giddiness, and similar sensations are due to a disturbance of this large neural mechanism. Clinically we should always think of vertigo in this concrete neurologic sense. In congenital affections of the vestibular apparatus the space sense is lost: these individuals may be rotated with impunity. Vertigo may result from labyrinthine disturbances, disease or injury of the vestibular nerve, and affections of the central nervous system, more especially of the brain-stem and cerebellum. Organic brain disease, e.g., tumour, abscess, multiple sclerosis, and encephalitis, may act directly on the nuclear and tract connections of the vestibular system; but frequently the vertigo is produced by circulatory changes and alterations in the pressure of the cerebrospinal fluid. Vertigo in *functional conditions* should also be referred to this neural mechanism; toxic, gastro-intestinal, and neurasthenic vertigo represent limited functional disturbances (toxic or circulatory in nature) of the vestibular mechanism. The vertigo of cerebral arteriosclerosis probably has a similar origin.

Psychic vertigo is a distressing impression and one of the important accompaniments of a vertiginous seizure. It is an acute painful consciousness of disorientation, an hallucination of the body sense in its relation to space. Psychic vertigo may persist long after vertiginous seizures have ceased, as a phobia or obsession. A rare and very severe form of this is the 'vertigo permanens' of Weir-Mitchell.

Ramsay Hunt emphasizes the good results which have occasionally been obtained by **Lumbar Puncture** in cases of labyrinthine vertigo, as first suggested by Babinski. From 5 to 20 c.c. of cerebrospinal

fluid are removed. It may be necessary to repeat the procedure at intervals of one or two weeks.

Jones and Fisher[3] state that there can be no impairment of the vestibular apparatus without dizziness. It is important to note the duration of the dizziness, its character, when it first appeared, whether it came on gradually or suddenly, whether the attacks come on with sudden change of position, and whether they are associated with nausea or vomiting. If staggering or falling is present, the direction must be noted. Noises in the ear are more likely to be absent in those disturbances of the vestibular apparatus which are located within the brain. Hearing tests are of the utmost importance, because a perfectly functionating cochlea usually presupposes a normally static labyrinth.

The Preliminary Examination is as follows :—

Spontaneous Nystagmus.—The patient, who should wear convex lenses, is instructed to look straight ahead of him at a distant point. Spontaneous nystagmus in this position is always pathological. The patient is then told to look to the extreme right and later to the extreme left. A certain amount of lateral nystagmus when looking to the extreme right or left is physiological, and is only pathological when it is of considerable amplitude. With the eyelids held wide apart the patient is now told to look directly upward and then downward. A spontaneous vertical nystagmus is invariably of intracranial origin.

Spontaneous Vertigo.—The patient is asked whether he has any sensation of turning. The patient may feel : (1) That he is moving in a given direction ; (2) That the outside world is moving in a certain direction round him, while he himself remains still ; (3) That he himself is moving in one direction and external objects in another.

Spontaneous Pointing.—The patient sits in the chair and is told to put his arm forward and point with his forefinger. The examiner holds out his own forefinger and allows that of the patient to touch it. The patient now raises his arm (without bending the elbow) to the perpendicular position, and immediately brings it back to touch the examiner's fingers. He is then directed to repeat this proceeding with his eyes closed. Should he deviate, the test is repeated to make sure that the deviation is constant.

Spontaneous Falling.—The patient stands with his feet together and eyes closed, and the result is noted. The head is now quickly turned to the right, so that one can observe whether this has any effect. Patients with intracranial lesions always fall in the same direction regardless of the position of the head, whereas a labyrinth lesion causes the patient to fall in the direction of the affected ear. A modification of this test is the 'attempt to overthrow.' The patient stands as before (feet together and eyes shut) while the examiner grasps his shoulders and attempts to overthrow him to the right or the left, forward or backward. The patient is instructed to resist this attempt by a balancing movement at the hips. A normal

individual balances perfectly, whereas in one with an affection of the cerebellar vermis the pelvis fails to compensate and the patient falls over at the slightest touch.

After the preliminary examination has been completed, the patient is subjected to the—

Rotation and Caloric Tests.—These depend upon setting in motion the lymph within the labyrinth. This stimulates the air cells in the ampullæ of the semicircular canals, and the impulses thus started are transmitted to the vestibular centres in the brain, and from them to the nuclei of the oculomotor nerves (producing nystagmus), to the cerebellum (vertigo and loss of balancing), and to the spinal cord (pointing error). Each canal, when stimulated, produces nystagmus and vertigo in its own plane. The eyes are always drawn in the direction of the endolymph movement in the canals; this constitutes the slow component of the nystagmus. The rapid component is of cortical origin. The subjective vertigo is always in the direction opposite to the endolymph movement. In regard to technique, Jones and Fisher have modified Bárány's chair so that the patient's head is placed immediately over the axis of turning. They have added an extra head-piece to permit rotation with the head inclined forward. The rod at the back of the chair is made longer, and there is a handle at the top of it to facilitate turning. The base is heavier, so that the chair may not wobble. The apparatus can readily be taken apart for transportation, and is suitable for the examination of the patient, and for small operations in the consulting room (*Fig.* 113).

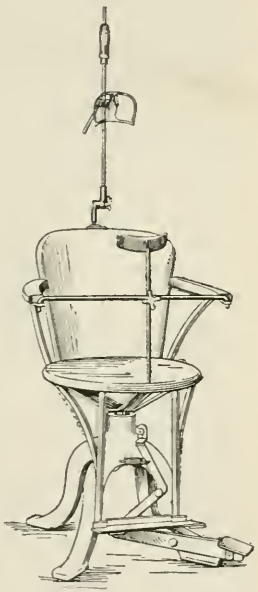


Fig. 113.—Jones and Fisher's modification of the Bárany chair.

Turning Test.—The patient is placed in the chair with his head tilted 30° forward and secured in the head rest. This brings the lateral canal into the horizontal plane. The turning test affects only those canals which are in the horizontal plane at the time of turning. During the turning the patient's eyes are closed. The chair is rotated to the right (ten times in 20 seconds), and stopped. The patient then opens his eyes, and the after-turning nystagmus is noted, the duration being taken with a stop-watch. Turning to the right produces after-nystagmus to the left of 26 seconds' duration in a normal individual. In a similar manner the patient is turned to the left, with the result that he has after-nystagmus to the right of the same duration. Vertigo after turning is always in the plane of the canal stimulated, but is in a direction opposite to the endolymph movement. In a normal

case the duration of the vertigo is about 24 seconds. To test the pointing error, the chair is turned at double the speed for nystagmus. The patient is told to keep his eyes closed throughout the entire test. As the chair is turned for the tenth time, the stop pedal is released by the examiner's right foot and the speed of the chair gradually slackened, so that the stop is accomplished without any jarring. The patient's right hand, with his forefinger extended, is then quickly grasped so that the forefinger touches the examiner's finger. At the word 'up' the patient raises his arm to the perpendicular, and immediately tries to bring it down again to meet the examiner's finger. The pointing error in the right arm is noted in inches, e.g., fifteen inches to the right. The left arm is immediately tested in the same way. In a normal case the vertigo lasts sufficiently long to permit of three pointing errors of each arm.

Should it be desired to test the two sets of vertical canals, the patient's head must be placed either 120° forward or 60° backward. [In the abstractor's opinion the vertical canals are best tested by bending the patient's head forwards and to the right so that the lambda approximates to the right shoulder. This tests the posterior vertical canal on the right side and the superior vertical canal on the left side, as these two canals lie on parallel planes. In a similar way, if the patient be rotated with his head bent forward and to the left, so that the lambda approximates to the left shoulder, the two remaining vertical canals—the posterior on the left side and the superior canal on the right side—will be brought into the horizontal plane.—J. S. F.]

Falling Reaction after Turning.—Turning a patient with the head tilted 30° forward produces no falling reaction, because the patient feels that he is revolving in a plane parallel to the floor. If, however, after turning with the head forward or backward, the head is brought to the upright position, the subjective sensation is now one of turning in a plane at right angles to the floor, and the patient tends to fall either to the right or left. The tendency to fall is in the direction of the endolymph movement, i.e., in the same direction as the slow component of the nystagmus.

Caloric Test.—The advantage of Bárány's caloric test is that it enables us to examine each ear separately. For the cold caloric test we employ water at 68°, while for the warm caloric test the temperature should be 112°. The douche-can containing the water is placed about two feet above the level of the ear to be douched. A piece of rubber tubing is connected to the douche-can, and ends in a nozzle. The shape or size of the nozzle is immaterial, the essential thing being that a free and continuous stream of water shall flow against the drum membrane. A rubber receptacle is placed under the patient's ear to catch the return flow, and from this receptacle a tube conducts the water into a basin below. The caloric test influences only those canals which are in a vertical plane. The duration of time from the instant at which the douching is started until the nystagmus appears

is measured with a stop-watch. In a normal person cold syringing of the right ear produces rotatory nystagmus to the left after 40 seconds if the patient is asked to look downwards. [If he be requested to look to the left the nystagmus usually appears in about 20 seconds. —J. S. F.] When nystagmus has been produced, the patient is told to close his eyes, and the pointing tests are done as described above with the patient's head still in the horizontal position. The head is then quickly tilted 60° backward to place the horizontal canal in the vertical plane. The patient is told to look up, and the existing rotatory nystagmus immediately becomes horizontal. The pointing of both arms is then quickly tested.

Electrical Reactions are of great use when the question arises of a differential diagnosis between a destruction of the labyrinth only and complete loss of function of the eighth nerve—e.g., between a case of healed labyrinthitis and one of tumour of the eighth nerve. In destruction of the labyrinth, the caloric test produces no reaction, but the electric current may directly affect the eighth nerve and so produce a reaction. Jones and Fisher state that a large electrode should be held in one hand, and a small one placed on the mastoid. The current should be gradually turned on, and when 4 ma. are discharged a nystagmus should appear.

Voltaic Vertigo (Babinski's Test).—Bourgeois[1] states that if in a normal individual the two poles of a continuous current are applied one in front of each ear, it is noticed that there is an inclination of the head and trunk towards the positive pole when the current reaches a sufficient strength—usually from 6 to 8 ma. The patient stands with heels together and eyes shut, while the observer stands in front and places the electrodes in front of each tragus. An assistant gradually increases the current until the reaction is obtained, and then diminishes the current to zero. During the flow the patient experiences a feeble vertigo, with a lateral impulse towards the positive pole—an impulse which it seems practically impossible to resist. A stronger current produces nystagmus, but the test then becomes rather painful.

In hyper-excitability of the labyrinth the reaction is obtained with less than the usual number of ampères. Further, the patient also feels very giddy for some time after the current has been stopped. (In normal cases the vertigo ceases instantly.) In hypo-excitability, even 15 ma. may fail to produce the slightest vertigo, while in some cases, of course, no reaction at all can be produced. In lesions of the labyrinth the patient tends to fall towards the affected ear whatever the direction of the current may be. Thus, in pathological conditions electricity exaggerates the spontaneous impetus. If the labyrinth be destroyed, however, there is no reaction.

The galvanic current produces: (1) A prickly sensation (due to stimulation of the sensory nerves of the region); (2) A salt taste in the mouth (stimulation of the chorda tympani); (3) A lateral incline with slight vertigo (vestibular nerve); (4) A strong current may

produce a sensation of sound (due to stimulation of the cochlear nerve). These three last results are produced by stimulation of the nerves which traverse the petrous pyramid. Bourgeois recommends that Babinski's voltaic test should be applied in all cases before the results of the rotation and caloric reaction are investigated. The writer records illustrative cases. Three of these presented no vestibular trouble, and in them the reactions were normal. In the fourth the labyrinth was completely destroyed by a wound of the head, and no reaction was obtained. In four cases of concussion which showed disturbances of balancing, there was hyperexcitability to Babinski's test. In these cases the incline was not towards the positive pole, but towards the side to which the patient himself tended to fall.

References.—[1]*Amer. Jour. Surg.* 1917, March, 67; [2]*Ann. Otol.* 1916, June, 446; [3]*Ibid.* 1917, March, 1; [4]*Progrès Méd.* 1917, Aug. 25.

VINCENT'S ANGINA. *J. S. Fraser, M.B., F.R.C.S.*

Bouty[1] states that during the last two years there has been a gradual and marked increase in the cases of Vincent's angina among the troops in France. In peace time this disease forms 2 to 3 per cent of all the cases of throat complaints in the French Army. Recent statistics show the proportion to be as high as 23 per cent.

Symptoms.—In uncomplicated cases the symptoms are sore throat, headache, malaise, and pain between the eyes. In the more severe cases there may be loss of appetite, wasting, and prostration. Ulcers, either superficial or deep, form on the buccal and pharyngeal mucous membrane. The ulcers are covered by a pseudo-membrane, and are most usually seen on the tonsil. Excessive smoking, septic state of the mouth, and irritant fumes, favour the disease, which is not uncommon among students and nurses at home. The temperature is raised for the first day or two, and the membrane is rapidly formed, thick, and abundant. It is adherent, and leaves a raw bleeding surface on removal. After two days the temperature falls to normal as a rule, but there may be slight pyrexia throughout in the more severe type, with marked adenitis or albuminuria. The breath has a very unpleasant odour. As a rule the membrane disappears in a few days if the case is thoroughly treated. Severe complicated cases are sometimes met with, and some deaths have occurred in French hospitals.

Bacteriology.—From the bacteriological point of view, two forms are met with: (1) The pseudo-membranous form, resembling diphtheria, in which we find abundant fusiform bacilli mixed with cocci; (2) The ulcerative form, in which we have a Gram-negative, mobile, flagellated spirillum, along with the fusiform bacillus. A mixed streptococcal infection is not uncommon.

Complications.—The following may occur: (1) Painful adenitis of cervical glands, in nearly every case; (2) Pyorrhœa alveolaris; (3) Stomatitis and gingivitis; (4) Quinsy; (5) Gastro-enteritis; (6) Nephritis; (7) Ulceration of the pharynx; (8) Bronchitis and

laryngitis; (9) Pleurisy and empyema; (10) Otitis media; (11) Endocarditis; (12) Osteomyelitis.

TREATMENT.—Bouty recommends **Calomel** in repeated small doses. Locally, **Perchloride of Mercury in Glycerin** (1–500), **Silver Nitrate, Methylene Blue, Neosalvarsan** applied in powder, or gargles of **Hydrogen Peroxide,** Vincent himself recommends that the membrane should be removed with a tampon, and that thereafter the raw surface be painted with 6 per cent tincture of **Iodine. Salvarsan** intravenously has been said to modify the disease and prevent recurrence.

Trench Throat.—Dan Mackenzie[2] states that trench throat is a romantic modern name for Vincent's angina. The disease has no connection whatever with trench life, except that its dissemination is favoured by the collection of large numbers of men in camps. When first seen, trench throat resembles tertiary syphilis very closely. The mistake is often confirmed by the curious fact that in a bad case of trench throat the Wassermann reaction may be positive. The affection is also amenable—sooner or later—to potassium iodide. Vincent's angina should never be confused with diphtheria, on account of the absence of constitutional symptoms. In a doubtful case the examination of a film or the bacteriological test may be relied on.

TREATMENT.—In camps or institutions the patient ought to be isolated, while in ordinary domestic surroundings feeding utensils and towels should be appropriated to the patient. In its early stages Vincent's angina can be aborted by local antiseptics, i.e., by touching the affected area with a crystal of **Silver Nitrate** or with pure **Phenol.** The most stubborn ulcers are seen in mouths and throats which were septic before the disease attacked them. In such cases powerful caustics are of little avail. The best plan is to put the patient to bed, give 10-gr. doses of **Potassium Iodide** thrice daily, and spray the throat with **Hydrogen Peroxide** (10 vols. per cent). Each spraying should be followed by a good rinsing of the mouth and throat with the old-fashioned **Potassium Chlorate and Tincture of Myrrh** mouth-wash. [This treatment by means of iodide internally and peroxide locally is really an adaptation of Pfannenstiel's method for dealing with lupus of the nose, and depends on the liberation of nascent iodine at the point where the iodide of peroxide meet.—J. S. F.] Carious teeth should only be removed if loose.

Goadby[3] recommends warm dilute **Chromic Acid** (1–200 to 1–400). This should be applied to the affected areas with a swab of cotton-wool wound round a probe. Immediately afterwards the affected area should be painted with a mixture of 20 gr. of **Chloretone** to the ounce of equal parts glycerin and spirit. Goadby holds that the chromic acid relieves pain and promotes the removal of necrotic tissue. A stock **Vaccine** of *Bacillus fusiformis* is indicated in the chronic stages, along with **Iron** and **Quinine,** fresh air, and plain food.

Bowman[4] holds that, as a spirochæte is present in Vincent's angina, **Arsenic** in some form would appear to be the ideal application. Of all arsenical compounds, **Salvarsan** is the least toxic, and as

a matter of fact salvarsan has a marked effect upon the condition. The expense of the remedy is the main objection to its use. Bowman has obtained favourable results from the followlng application :—

℞	Vin. Ipecac.	℥ss	Li ɟ. Arsen.		ad ℥j
	Glycerin.	℥j			

M. Ft. mist.

This solution should be applied to the gums and pockets round the teeth with a small applicator. Ulcers should be treated in same way.

Emrys-Roberts[5] recommends the local application of the following solution :—

℞	Hydrogen Peroxid.	℥v	Glycerin.		℥v
	Vin. Ipecac.	℥iij	Aq.		ad ℥viij

By the use of this lotion the familiar gingivitis is usually cured in about six days, while the throat condition clears up altogether in from twenty-four to forty-eight hours.

References.—[1]*Brit. Med. Jour.* 1917, ii, 685 ; [2]*Med. Press and Circ.* 1917, i, 409 ; [3]*Lancet*, 1916, i, 958 ; [4]*Brit. Med. Jour.* 1916, i, 373 ; [5]*Ibid.* 1917, ii, 360.

VOMITING. *Robert Hutchison, M.D., F.R.C.P.*

Grober[1] describes three cases of continuous vomiting which illustrate the variety of the causes liable to keep up the vomiting. Removal of the cause is the main thing, but in the meantime the quiet and warmth of the bed are always useful, and the patient must remain there, with extra heat applied to the stomach region with a woollen cloth, fur, or a flat sack with hay, using nothing heavy. No food or drink should be allowed by the mouth for at least twenty-four hours. Thirst should be relieved by way of the rectum. Later, scraps of ice can be taken in the mouth ; as they melt, the fluid must be expelled, not swallowed. Patients usually fail to do this, so it is safer to refrain from the ice. Changes of position should be avoided, even for examination ; the patient should keep absolutely still. Sedatives can be given by the rectum ; he has found 2 or 2·5 grms. **Chloral** in 30 c.c. water very useful, as also **Codeine** suppositories. When sedatives can be given by the mouth, he has found most excellent a solution of 1 grm. **Menthol** in 100 c.c. water, with 20 or 30 c.c. **Brandy,** giving a teaspoonful three or four times a day, especially when there is much exhaustion. A few drops of **Chloroform** on a scrap of ice may prove useful. **Potassium Bromide** may be indicated when the patient is very restless, or in case of hysteria or pregnancy. If the vagus system seems especially involved, **Suppositories** made with 0·02 or 0·03 grm. extract of **Belladonna** sometimes give relief. **Morphine** or its equivalent ensures the needed rest for patient and family, and rests the stomach, but it is dangerous if there is a tendency to collapse.

Grober warns that household remedies may have been taken which directly promote the vomiting, and this should always be inquired into. Worry and physical exhaustion may bring about continuous vomiting ; in one of the cases described, uræmia was responsible for

it, the system trying thus to throw off the toxins. **Venesection** is indicated here, with **Lumbar Puncture** and tapping. In another case the vomiting was traced to compression of the vagus centre by a cerebral tumour. In a third case hysteria was responsible; the woman looked rosy and well nourished, and only part of the food ingested was vomited. **Suggestion** and some bitter tincture by the mouth were indicated here.

REFERENCE.—[1]Abst. in *Jour. Amer. Med. Assoc.* 1917, i, 742.

VOMITING SICKNESS OF JAMAICA.

Sir Leonard Rogers, M.D., F.R.C.P.

H. H. Scott[1] gives an interesting account of this disease and the solution of the problem of its etiology. It has existed for many years during the cooler months from November to March or April, and causes a number of deaths, chiefly among children. It has often been returned as gastritis, malaria, cerebrospinal meningitis, or yellow fever. In 1910 an expedition was sent from England to investigate, and again in 1912, but without result. In February, 1915, eighteen deaths occurred in two days, and the writer of this paper was sent to investigate it, and saw a number of cases from start to finish. The little patients are suddenly attacked with abdominal pain, followed by sickness, and may recover in a few hours, or after a few hours' interval the symptoms recur with convulsions and coma, followed by rapid death. The temperature is usually normal, and the pulse and respiration remain nearly normal almost to the end. The mortality is very high. The average duration of fatal cases is 12·72 hours. Pathologically, hyperæmia and œdema, with a tendency to hæmorrhages, occur in nearly all the organs, including the meninges. These have been described by the author more fully in another paper.[2] The symptoms and short duration of the illness point to poisoning rather than a bacterial disease. Investigation of 32 cases showed that in 17 the attack closely followed the ingestion of ackees, or a watery soup made from them, while in 8 others there was a strong probability of a similar history, and in none of the cases could the eating of this fruit be excluded. The ackee is the fruit of *Blighia sapida*, which is extensively consumed in Jamaica. When gathered ripe, properly opened, it is harmless, but those unripe or from an injured branch are dangerous. By feeding kittens, etc., with a watery extract of unripe fruit, a fatal disease resembling vomiting sickness was successfully produced.

REFERENCES.—[1]*Trans. Soc. Trop. Med. and Hyg.* 1917, Jan., 47: [2]*Ann. Trop. Med. and Par.* 1917.

VULVO-VAGINITIS IN CHILDREN.

Frederick Langmead, M.D., F.R.C.P.

B. K. Rachford[1] draws attention to the many obscurities and difficulties in connection with this disease. It appears that, whilst very contagious to children, adults are insusceptible or immune. This feature of the disease has never been satisfactorily explained. Another distinctive attribute of the disease as it occurs in children is that it is

spread in a manner quite different from that in adults, for the number of cases of infection in childhood by sexual contact is negligible. Both adults and children are equally susceptible to gonococcus infection, and yet the methods of spread could not be more unlike.

Treatment.—Rachford prefers the simple methods of treatment, such as irrigation with two quarts of normal saline, followed by the injection of two or three ounces of a 1 per cent solution of **Silver Nitrate,** to the more severe forms of treatment involving the direct application of strong astringents and antiseptics to the vaginal vault and uterine cervix. Local treatment unquestionably shortens the course of the disease. He expresses himself as much impressed with the idea that physicians have not given sufficient attention to the ill effects which may result from continued local treatment, and advances a small outbreak of masturbation in his wards to support his view.

The committee of members of the American Pediatric Society[2] have published a report of their investigations. It appears that the gonococcus is the infecting agent in about three-quarters of the cases. But from the work of Pearce on the agglutination and complement-fixation reactions it seems that there are two chief varieties of the gonococcus corresponding with the infantile and adult forms of the infection as met with clinically. For some reason the infection is less dangerous to children than it is to adults. It may be that the organism which infects children is less virulent, or that they have greater resistance. Yet, in 1914, 64 children under ten years of age died of gonococcal infection in America, and it is considered that most of these were infected by the vaginal route.

Condat[3] reports twenty-four additional cases, bringing to forty the number of patients whom she has treated with **Antigonococcus Vaccine.** It always proved effective; all were cured with the exception of one girl, over seven years old, infected by its mother. The site selected for the injection is the muscle of the outer part of the front of the thigh. She injects the vaccine three times a week until the discharge lessens, then twice, and then once a week only, the course varying from two weeks to an average of two months.

References.—[1]*Amer. Jour. Med. Sci.* 1917, i, 107; [2]*Trans. Amer. Pediatr. Soc.* xxviii (rev. in *Brit. Med. Jour.* 1917, i, 767); [3]*Arch. de Méd. des Enf.* May, xx, No. 5, 245 (abstr. *Jour. Amer. Med. Assoc.* 1917, ii, 72).

WAR NEPHRITIS. (*See* Nephritis.)

WAR NEUROSES. (*See* Shell Shock; *also* Mental Diseases.)

WEIL'S DISEASE. (*See* Jaundice, Infective.)

WHOOPING-COUGH. *Frederick Langmead, M.D., F.R.C.P.*

Of the many treatments for this disease, the administration of **Bromoform** is one which, formerly much advocated, has recently fallen somewhat into disuse. Neal Kitchens[1] ascribes the disappointing results he met with at first to the mode of administration.

It should, he says, be given alone in doses of one drop for each year up to five, when the maximum dose is attained. He mixes the dose with two-thirds of a teaspoonful of simple syrup, and administers it immediately, repeating the procedure three times during the day and once at night. By this means good results are obtained.

With V. Large's[2] statement that no remedy has been discovered capable of curing whooping-cough most of us will agree. He attributes the disease neither to the influenza bacillus nor the Bordet-Gengou bacillus, but to an unknown organism. In the later stages, when the cough persists, he has found the use of **Potassium Iodide** most beneficial, and also advocates its employment as early as is possible in the disease, in order to hasten the expulsion of the specific organism from the respiratory tract. Moderate doses are all that are necessary.

Use of **Vaccines** (p. 34) : **Garlic** (p. 15).

REFERENCES.—[1]*Ther. Gaz.* 1916, Dec., 842 ; [2]*Berl. klin. Woch.* 479 (abstr. in *Clin. Jour.* 1916, Sept., 332).

E. W. Goodall, M.D.

In two papers, the one by P. Luttinger,[1] the other by Auna von Sholly, J. Blum, and Luella Smith,[2] will be found recorded the results of the **Vaccine** treatment of this disease in the whooping-cough clinic in the city of New York. In neither of the papers is it stated exactly what vaccine was used, but there were several, made from different varieties of the Bordet-Gengou bacillus. Nor is it made clear whether different or the same cases are dealt with in the papers. The authors write most cautiously as to the conclusions to be drawn from the recorded facts, on account of the presence of several disturbing factors. They contrast the results of the specific vaccine treatment with those of treatment by drugs and other vaccines, e.g., influenza bacillus.

Luttinger states that it seems that at least three injections are necessary to make a lasting impression on the disease. These are given at intervals of forty-eight hours. An interval of from five to seven days should then elapse before another injection is given, and three injections are given at intervals of three days. The first injection consists of 500 million organisms, the second of 1 billion, the third of 2 billion. The second series consists of from 2 to 4 billion, increased to 10 billion for the third injection. This author concludes that his results warrant the routine administration of the vaccine for both curative and prophylactic purposes ; that the best time to institute the curative treatment is during the first and second week of the paroxysmal stage ; and that the disease is materially reduced in duration and severity. His recorded observations, however, hardly bear out these conclusions. The more detailed records of the other writers go to show that the specific treatment is not more valuable than the drug treatment, and the writers themselves state that many more observations must be made before a just conclusion can be arrived at.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1917, ii, 1461 ; [2]*Ibid.* 1451.

WOUNDS, GUNSHOT, AND WOUND INFECTIONS. (*See also under the different regions or organs.*)

Deputy Surg.-Gen. A. Gascoigne Wildey, R.N.

In the early days of the war the disasters following primary suture of gunshot wounds after cleansing by the methods then in use, led to the general abandonment of such treatment in favour of the open method with débridement and drainage. The open method, whether conducted on physiological or on antiseptic lines, has saved many lives, but it is by no means an ideal form of treatment, entailing as it does a slow healing, with deep cicatrization, leading often to impairment of function. With a better understanding of the nature of wounds caused by modern projectiles, together with a fuller knowledge of the bacterial flora of wound infection, there has arisen a distinct movement—especially amongst French surgeons—towards a return to primary suture when circumstances are favourable for carrying out the highly exacting and often lengthy operation of preparing the wound for closure. It is fully recognized that, with the exception of the simplest forms of rifle-bullet wounds, the lesions caused by the internal explosive action of high-velocity projectiles extend far beyond the visible tracks in the tissues, and it is accepted as an axiom that this devitalized tissue is to be reckoned as a more dangerous foreign body than any bullet, shell fragment, or other extraneous material; for in all such dead tissues, and especially in muscle tissue, the anaerobic micro-organisms of fæcal origin, which are practically certain to be introduced into every wound received in trench warfare on the Western front, grow with astonishing rapidity. It is therefore imperative that this 'foreign body' should be excised before primary suture is attempted. Fragments of clothing, since they are certain to be infected, and jagged shell fragments and wood splinters, since particles of cloth are always likely to be entangled in them, must be removed. If a proper technique has been observed, a wound thus completely excised has been *sterilized by the knife*. It is almost superfluous to apply antiseptics to the exposed healthy living tissues. The wound may be regarded as an ordinary operation wound, and closed in layers without drainage. For success the following conditions are essential: (1) The operation must be performed within a few hours of injury; (2) It must be conducted with every aseptic precaution; (3) Immobilization of the injured part. Constant supervision for several days after the operation.

1. Granted that all trench wounds receive infecting organisms at the moment of injury—and occasionally gas gangrene has been known to develop under four hours—there is an average latent period of about twenty-four hours. During this period, if the wound appears 'clinically' aseptic and there is no constitutional disturbance, Chalier[1] is content to rely on the absence of clinical signs of infection, and to operate without bacteriological examination. He refrains from operating when there is profuse hæmorrhagic oozing impossible to

control without plugging. With this exception he holds that the only contra-indications are local infection, severe fractures, and fractures into joints. Grégoire and Mondor[2] operate up to and beyond twelve hours if there is no special contra-indication. After forty-eight hours they hold it prudent to abstain. The only limitations they definitely impose are signs and symptoms of infection. Lesions of bones Dézarnaulds[3] does not consider to be a contra-indication; all depends upon their intensity and situation. He refrains from operating on wounds with fracture of the thigh-bone. Wounds of the knee-joint give very satisfactory results under treatment by primary suture. It is desirable to operate, if possible, within six hours of the injury, notwithstanding the fact that many cases at this time will be suffering from some degree of shock. Much can be done to minimize the shock. Every hour of delay favours the development of gas gangrene.

2. To obtain proper aseptic conditions, primary suture should be performed only in a well-appointed, well-staffed operating-room. At the present time the stationary warfare in the West permits the presence of more or less permanent hospitals within easy access of the fighting area. A large staff is necessary if many wounded are to be treated, for the preliminary cleansing and the operation itself, in cases of multiple wounds, will occupy at least one hour. Some idea of the proportion of cases suitable for primary suture can be gathered from the experiences of Grégoire and Mondor, who, dealing with a batch of 124 recently wounded, were able to close primarily 35 cases. Naval wounded, since they are not exposed to virulent forms of infection, are very satisfactorily treated by early closure when they can be received into hospital within forty-eight hours of action. It does not seem advisable that the method should be practised on board, since all wounded are transferred from the ships as soon as possible, and these cases should not be subjected to the risks attending transport.

3. Complete immobilization of members operated upon is insisted on. It should be possible for the case to remain under the constant observation of the surgeon for at least fourteen days. Prompt interference will be required should infection appear.

Technique of the Operation.—The skin around the wound is shaved, cleansed, and sterilized in the usual manner. The wound-edges are excised. If a missile is lodged, *x*-ray plates will give some idea as to how much the skin wound should be enlarged. The direction of the extension of the wound should be made with regard to functional results. In the limbs the direction should be, if possible, in the long axis. All damaged tissues are freely removed, the instruments used being changed from time to time as the excision proceeds. The track of the missile may have to be laid open freely. When this is impossible, it is thoroughly curetted. Damaged muscle-tissue is removed until healthy, bleeding, contractile muscle is exposed. Hey[4] recommends application of ½ per cent watery solution of **Brilliant-green** to the wound surfaces to stain the devitalized tissues and

thereby show up the tracks. Every particle of stained tissue should be removed. This may necessitate long incisions and free division of bridges of muscle. As the dissection proceeds, the wound is flushed out with saline or a solution of **Magnesium Chloride.** Antiseptics are not recommended by the French writers on the subject. When the missile is reached, an attempt should be made to remove it together with the surrounding damaged tissue *en masse.* All bleeding points must be secured. Extra care is given to the obtaining of a perfectly dry wound. The muscles and aponeuroses are secured, nerves are sutured, and the wound is closed, preferably without drainage. Some plastic manœuvring and under-cutting may be necessary. Tension-relieving incisions may be required.

In naval hospitals for many years the writer has practised primary suture after excision of all damaged tissues in cases of smashing injuries occurring in ships and in naval dockyards, and during the past year in several cases of shell wounds. In his opinion artificial drainage should be avoided. Every effort should be made to obtain perfect union of the skin by first intention, so that no contamination can reach the deep wound from without. In the few cases that have become septic in the writer's experience, the infection has invariably started in the skin wound, either from some sloughing of its edges or from adjacent septic foci, such as blisters or abrasions. To introduce anything in the nature of an artificial drain is to invite secondary infection. A slackly-tied stitch or two allows sufficient exit for any serous oozing during the first forty-eight hours. If the surgeon fears to close the wound without drainage, he had much better leave it entirely open, some inhibitory or antiseptic dressing being applied, with a view to secondary suture when he feels confident this can be done with impunity. In order to avoid any possibility of gaping from a faulty interrupted stitch, the writer makes two loops of a continuous mattress suture, its free end or tail being caught in the second loop and the two ends tied across the incision (*Figs.* 114–117). The effect of a series of these stitches is to give a desired amount of elevation of skin edges (as with a Michel's clip) with an accurate adjustment of the dermal margins. This stitch has given great satisfaction for several years. Recently Aymard,[5] writing on the principles of plastic surgery, draws attention to the insecurity of the ordinary interrupted suture, and points out the advantages of the mattress stitch. The modified mattress suture, described above, has all the advantages and none of the disadvantages of suture by Michel's clips. All oozing ceases in forty-eight hours. The wound is then kept as dry as possible, and may with advantage be painted with Cheatle's[6] rosalan solution or Archer's fuchsin solution (fuchsin 1 part, hydrarg. perchlor. 2 parts, spt. vini rect. 1000 parts), and exposed to the air without dressings. All neighbouring abrasions or tension-relieving incisions are covered with a thin film of cotton-wool painted over with one of the above solutions ; this forms a dry aseptic scab.

Naval cases of shell wounds (generally multiple) have been success-

fully treated by excision and primary suture without drainage up to forty-eight hours after injury; but such cases have not been exposed to the infection of anaerobic organisms, and most of them have received early some form of superficial antiseptic dressing. The results obtained in French war cases are good in spite of the fact that the perfringens is found in nearly all the wounds. Of 125 cases, including 73 complicated with lesions of the bones, vessels, joints, and viscera, Grégoire and Mondor obtained 111 successful results. In 200 cases, mostly severe, Dézarnaulds had a mortality of 5 : 3 from tetanus, 1 peritonitis, 1 chronic septicæmia. He had *no cases of gas gangrene*.

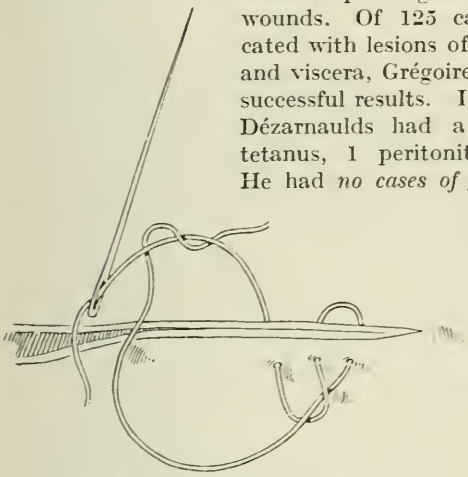


Fig. 114.—Mode of insertion. (The mattress loops are tightened before tying the suture.)

When circumstances do not permit a primary suture, healing may be hastened by an early or a late *secondary suture*. We may call those cases 'early' which are closed three to five days after injury. They include cases which have had no earlier operation, and those treated by excision early, with the sutures

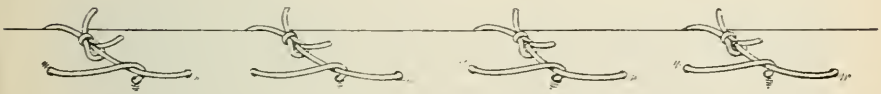


Fig. 115.—The stitches in series, elevating the skin edges and securing close and exact apposition without risk of inversion. Gaping is impossible.

Fig. 116.—The sutured wound in section. (There is practically no suture material in the wound cavity, therefore a minimum risk of infection.)

Fig. 117.—Section of wound closed by ordinary interrupted sutures. Note the comparatively large amount of suturing material in wound cavity.

Figs. 111–117.—WILDEY'S SKIN SUTURE.
By kind permission of the 'Journal of the R.N. Medical Service.'

left in position but not tied until the surgeon is satisfied that there is no risk of infection. In 'late' secondary suture the wounds are freely granulating or cicatrizing. Further operation is required—generally under an anæsthetic—to remove the granulations and cicatricial tissue, to pare and undercut the skin edges, and insert sutures.

Early Secondary Suture.—A thorough surgical overhaul undertaken within a few hours of injury may be in itself sufficient to sterilize the wound for practical purposes, and many surgeons who prefer to wait developments before closing are content to use only 'physiological' applications to inhibit infection: others trust to antiseptics, either in powder, paste, or liquid form, to maintain asepsis by continuous bactericidal action. Vincent[7] claims that a dry powder of **Boro-hypochlorites** is the best prophylactic application. Wounds dusted or insufflated in the advanced dressing stations have remained surprisingly clean for many hours, permitting the patients to recover from shock, and the surgeon to delay operation when under pressure of work. Its application is painless and non-irritating; its toxic effects are negligible. Complete penetration to the depths of the wound can never be obtained; but this is claimed to be unnecessary, since the chlorine disengaged will exercise a continuous action at a distance. Vincent's powder consists of hypochlorite of lime (100 to 110 litres of chlorine) 10 parts, boric acid 90 parts. These are powdered separately and kept in a dry coloured glass vessel. Rutherford Morison's[8] '**B.I.P.P.**' and Hey's[4] **Brilliant-green Paste** are effectual in inhibiting infection when applied after a surgical toilet. 'Bipp' suppresses all signs of infection for an indefinite time, but it has disadvantages which will be discussed later. It is most useful in late secondary suture. Hey, having found that a combination of brilliant-green and boric acid proved of greater antiseptic power than brilliant-green alone, formed a paste of these with French chalk and liquid paraffin, having learned from the composition of 'bipp' that the combination of an oily fluid and an amorphous powder gives the sought-for quality of adhesion to freshly-cut tissues. Formula for Hey's paste: Boric acid 11 oz., French chalk 1 oz., liquid paraffin 8 fl. oz., brilliant-green 17½ gr. This gives a strength of brilliant-green of 1–500. When the clinical aspect of the wound and the patient's general condition are favourable, notwithstanding a smear count showing an average of up to nine organisms per microscopic field, the wound, although glazed and green with the paste, may be safely sutured after a surgical toilet.

Tavernier[9] prefers early secondary to primary suture. A complete surgical toilet is made as soon as possible after injury; nerves are sutured when divided, and wound surfaces are swabbed with iodine, which he finds an efficient antiseptic after excision. The wound is drained. The temperature should fall to normal in two to three days. After one day of normal temperature the wound, if clinically healthy, is closed. He does not require any bacteriological evidence of asepsis, and is surprised to find how frequently doubtful cases do well. The stitches left in place during the primary operation are tied. Drainage is rarely required. On 79 men, many with multiple wounds, Tavernier performed 200 secondary sutures with only 2 complete failures. Of these cases, 52 were early cases, i.e., under six days.

Carrel's[10] Method of obtaining constant application of Dakin's

hypochlorite solution has taken the place of irrigations. It has proved useful in early as well as in late secondary suture ; under this latter heading it will be described in detail. When late secondary suture is undertaken after an early and complete surgical toilet, the same inhibitory methods described above may be employed.

Desplas and Policard[11] recommend **Heliotherapy,** continued for about eight to ten days after injury. No antiseptics are used. The wound is sutured when, after five to six days of normal temperature, the clinical signs are favourable, bacteriological verification being unnecessary. These authors call special attention to the importance of removing all scar tissue to avoid sclerosis of muscles. Observations show that the granulation of a wound is produced from underlying muscles and is surrounded by an area of embryonic connective tissue rapidly becoming adult, forming fibres which adhere to the bottom of the wound and start a centre of sclerosis involving the muscles in the general cicatrix. Also, an extensive removal of wound surface is necessary, since it has been shown that very frequently microscopic foreign bodies are emeshed in the granulation tissue, a condition which is put forward as an explanation of ' latent infection.' After excision of scar tissue, the wound is anatomically reconstituted by suturing in layers. Of 97 cases treated by heliotherapy and secondary suture, Desplas and Policard record all were completely successful except one, when failure was due to faulty catgut.

When secondary suture is delayed on account of sepsis, the methods of Rutherford Morison and of Carrel compete for the first place in general popularity. Both have been of the greatest value in the cure of wounds. A combination of the two methods is described by Phillips[12] as the ' Bradford method.'

The 'B.I.P.P.' Method.[8]—In the treatment of *infected* wounds, Rutherford Morison aims at introducing into the wound antiseptics which by a continuous action inhibit bacterial growth and permit healing. For the skin he uses 1–20 carbolic lotion, and for the wound, alcohol, and a paste of iodoform 16 oz., bismuth subnitrate 8 oz., liquid paraffin 8 fl. oz. The name ' bipp ' indicates its constituents and their proportions. When first introduced, it was advised that the wound should be filled with the paste, but the somewhat frequent occurrence of iodoform and bismuth poisoning brought the method into disfavour. It is now shown that good results without trouble from absorption can be obtained by using a very small quantity of the paste well rubbed into the wound surfaces. Morison thinks it unnecessary to dissect out the wound. He removes only such portions of tissue as are obviously dead. Through-and-through wounds are cleansed by threading long strips of gauze, first dry, then wet with spirit, and finally charged with B.I.P.P, which is worked into the wound by to-and-fro movements. Open wounds, after surgical cleansing, are wiped over with spirit and rubbed with the paste ; they are closed at once with thick, sterile silk sutures which have been soaked in tincture of iodine or rubbed in B.I.P.P. One or two sutures are

left tied sufficiently loosely to allow extrusion of the paste as the interior of the wound heals. The final dressing is of gauze—either dry, moistened with spirit, or rubbed with B.I.P.P.—covered with an absorbent pad. This *dressing is not changed for days or weeks* if the patient is free from pain and constitutional disturbance. When re-dressing, the wound is covered with a dossil of wool soaked in spirit, and the sticky, dirty-looking discharge is wiped off the surrounding skin. Remarkable results are given showing complete suppression of sepsis in acutely suppurating compound fractures involving joints, after one application of the paste. When B.I.P.P. has been efficiently applied to every part of a wound, it generally renders such wounds surgically sterile ; but the healing process is undoubtedly slow ; the wound edges are pale and ' mean ' looking. Too often the stitches cut out. Yet, in spite of the feeble appearance of the surface and the sickly-smelling discharge, the wound itself remains clinically aseptic without any tendency to flare up.

After a few days the general appearance of a ' bipped ' surface-wound that has not been sutured suggests that it wants stimulating. At this stage it is well to wipe out the paste and use some other application. **Brilliant-green,** in the writer's experience, completes the healing with astonishing rapidity. The delay in healing in ' bipped ' cases has been attributed to the liquid paraffin base ; but Gray,[13] writing on the curative action of liquid paraffin on inflammatory symptoms in the walls of a wound and in the adjacent tissues, suggests with Hey that as the same delay is not observed in paraffin pastes made up with antiseptics soluble in serum, it is probable the excess of bismuth subnitrate and iodoform in B.I.P.P. is responsible by preventing adhesion of apposed surfaces.

When this paste is used in excess (Phillips[12] puts the maximum at one eggspoonful), rapid pulses, high temperatures (from poisoning by iodoform), blue gums, anæmia, and constipation from bismuth (and from lead when the bismuth is impure), are not uncommonly noted. The method does not insist on the anatomical reconstitution of the deep parts. At present it is too early to compare the final functional results with those obtained by other methods. Although falling short of the ideal, B.I.P.P., from its labour-saving simplicity, its painlessness, and its deliverance of the patient from the need of frequent dressings, marks a real advance in wound treatment. It has been suggested by Helen Chambers and J. Goldsmith[14] that the bacterieidal action results from the free iodine liberated by the oxidization of the iodoform by oxygen and by the nitric acid formed by hydrolysis of bismuth nitrate. May be, its virtue is not altogether in the chemical antiseptics, but associated in some fortuitous way with the paraffin base. It is possible, too, that modifications and substitutions in its formula will make its name no longer appropriate. Meanwhile the paste is adopted by many as a treatment not less efficient than the constant-fluid methods, and welcomed as one far more convenient to apply.

In the **Carrel Method,**[10] employed after the usual surgical toilet,

sepsis is inhibited or overcome by conveying **Dakin's Fluid** (Dufresne's technique) to the wound by special tubes connected to an overhead reservoir, with the purpose of keeping the antiseptic constantly in contact with the whole wound surface. *It is not an irrigation.* Dependent drainage is avoided, the object being to keep the wound basin-like, filled with the fluid, which is refreshed every two hours by releasing a clip on the main tube. When the wound is in a position which prevents it holding the fluid, some layers of gauze are placed in the wound with the tube beneath them. Care is taken that the gauze lies entirely within the wound margins, and that the fluid does not overflow and cause irritation of the skin, which should be protected with vaseline. The Carrel rubber tubes which enter the wound are perforated with small holes ; these tubes are attached to the branching outlets of a glass distributor, connecting them to the main tube of the reservoir. The number of Carrel's tubes used vary with the size and depth of the wound. They must efficiently bathe all its parts. Gauze is loosely packed about the tubes, and lightly over them, with a towel protecting the whole dressing if necessary. In superficial wounds Carrel's tubes are covered with Turkish towelling, or the tubes are secured by a rubber cuff and suture, or a two-way tube may be used. In through-and-through wounds a perforated tube with the tied extremity uppermost is passed from the lower to the upper wound. The liquid flows back to the inferior orifice. Wounds of the hand and foot and amputation stumps are immersed. A bacteriological count is made from surface smears every second day. When microbes are absent or reduced to a safe minimum for three successive days, the wound is considered sterile. Wounds of the soft parts are sterilized in five to eight days, fractures in from three to four weeks. When sterile, the wound is closed in layers after skin-paring and removal of granulation tissue.

It is claimed that wounds thus treated are entirely different from those treated by other methods. They show next to no secretion, and appear remarkably fresh. They unite quickly with a minimum amount of connective tissue. Depage[15] records 137 sutures with 112 complete successes, and 23 partial successes where a few stitches had given way. Lyle[16] quotes a personal communication from Carrel to the effect that in August, 1916, the Ambulance Carrel had closed 450 wounds with only 6 failures. He states also, that "on Aug. 2 Depage had 80 compound fractures without a single drop of pus." Highly-trained attendants and the most punctilious care in carrying out an exacting technique are required to obtain uniformly good results. Unless under constant observation and skilled attendance, the wounds suppurate, especially during transport.

Phillips,[12] in the Bradford War Hospital, treating infected cases on their arrival from France, employs a combination of the Carrel and B.I.P.P. methods. The wounds are sterilized by the Carrel technique until smears of the discharge stained with brilliant-green show a steady average of less than three organisms per field when ten fields

are counted. When closing the wound the skin edges are trimmed and undercut, scar-tissue removed, and granulations curetted. The whole wound area is swabbed with methylated spirit, and a *very little* of the paste rubbed into the raw surface. Muscles are sutured and 'dead' spaces closed. A continuous catgut stitch is used to complete the coaptation of the skin edges, which are smeared with **Moynihan's Cream** (bismuth carbonate in 1–1000 watery solution of HgI_2, to make a thick paste).

Wounds treated by the Carrel method are under suspicion of being prone to secondary hæmorrhage. Kenneth Taylor,[17] investigating the effects of chlorinated soda solution (Dakin's) on catgut, finds that it causes a slimy deposit on the ligature, causing slipping of even a triple and quadruple surgical knot, to an extent that makes it impossible to test the tensile strength of the catgut, because in every case the knot slips on the addition of a weight below $2\frac{1}{2}$ oz. The gut is not eroded. Experimenting upon the digestive action of bacteria on catgut, he finds only one, the *B. capsulatus* (*perfringens*), attacks and erodes it. He states: "The neutral solution of chlorinated soda possesses a very low bactericidal value against the gas bacillus, and favours, in addition, the other chief causes of arterial escape, namely, the loosening of fibrin plugs and the softening of the vessel walls. Thus, in a wound infected by the gas bacillus and treated with hypochlorite solutions, all the factors combine to favour hæmorrhage. The neutral solution of chlorinated soda would appear, from the experimental evidence, to be contra-indicated in cases in which important blood-vessels are exposed in the wound, and especially if such a wound shows an active infection by the gas bacillus."

One of the chief objections to the Carrel method is the skin irritation caused by the solution. A great part of his elaborate technique is directed to avoiding this irritation. Dakin, Lee,[18] and collaborators have introduced solutions varying from 5 to 10 per cent of the practically stable, non-irritating, synthetic double chloramine compound, **Dichloramine-T,** dissolved in chlorinated eucalyptol, with or without chlorinated liquid paraffin. The germicide is slowly liberated over a period of from eighteen to twenty-four hours instead of from thirty minutes to an hour as with the hypochlorite solutions. In common with the hypochlorite it has the power of dissolving dead tissues. Hæmorrhage therefore must be stopped by ligation, or the clot will dissolve and secondary hæmorrhage occur. Dichloramine-T is used after a thorough surgical preparation of the wound. It is either applied with a spray or the wound cavities are filled with the liquid. When dependent drainage exists, the lower orifice is closed with gauze and the wound filled with the antiseptic. Drainage can be re-established by removing the gauze plug. This in itself is an advantage over the Carrel treatment. The oil is applied once in twenty-four hours. The introducers have replaced the complicated and expensive Carrel method by the routine use of dichloramine-T, and claim that the time required for healing has been reduced by 16·3 per

cent. Sweet,[19] testifying to the value of dichloramine-T, concludes that it saves the pain of wound-dressing; it effects an appreciable saving of dressing-material; the amount of solution needed is of small bulk; the number of wounds which a surgeon can dress in a given time is far greater than by any other method.

Heliotherapy and **Light Treatment** have come into favour recently. Leriche and Mendeléeff[20, 21] have studied the mechanism of heliotheraphy by means of bacteriological examinations. In the fluid which oozes abundantly when wounds are exposed to the sun, they find, after a short period, abundant vivacious leucocytes engaged in phagocytosis, a phagocytosis which completes the action of the mechanical disinfection. Sunshine acts more rapidly on certain microbes than on others. *B. pyocyaneus* disappears after one or two fifteen-minute sun-baths, the *Vibrion septique* after half an hour, the *Vibrio proteus* after six hours. Wounds receiving a proper surgical toilet are sterilized in forty-eight hours after two sun treatments, one of thirty minutes, the other of two and a half hours. In the least favourable cases four to six days are required. Heliotherapy is applied in the form of short progressive treatments varying in length with the strength of the sun's rays. Exposures for the first few days are limited to fifteen minutes, so as to avoid excessive reaction and erythema. A preliminary surgical toilet is always necessary. When wounds—non-suppurating wounds—do not improve rapidly under this treatment, it is probable there is still some diverticulum, foreign body, or sequestrum which has escaped surgical attention. Where sunshine is not available, electric light is employed, as suggested by Chaput. The omission of dressings is in itself an important factor in heliotherapy and light-treatment, since all dressings must encourage a certain degree of foreign-body reaction. Crile[22] covers the wounds with pasteboard cones in which are placed electric lamps. These hoods are suspended from a frame or cradle. The lamps are close enough to the wound to permit a comfortable warmth; they may be kept burning night and day without harm. Crile combines the treatment with frequent cleansing with Dakin's solution or with hypertonic saline.

Soap.—As the result of experiments in 1500 dressings, Ratynski[23] concludes that in a soap solution he finds an alkaline antiseptic—cytophylactic, non-irritating, and absolutely inoffensive. The dressings were used exclusively on wounds more or less lacerated and already infected, such as crushed limbs, ragged surfaces after limbs had been torn away, open joints, and complicated fractures. Seton wounds and bullet wounds were not treated He employs Marseilles soap of commerce, standardized at 72 per cent. A solution of 25 grms. per litre of water, sterilized or boiled, is used for irrigations and lavages, a 20 per cent solution for charging compresses. The solution produces in suppurating wounds a viscid, stringy fluid, and, apart from its detergent qualities, is useful in revealing the presence of pus in remote interstices. Irrigation is continued until no viscidity is

seen. The wound is lightly and very carefully packed with compresses of gauze into which the 20 per cent soap solution has been kneaded. The object of kneading is to produce "a spongy tissue which essentially consists of minute air bubbles." If lightly applied without any plugging, the saponaceous dressing is stated to act by sucking away the pus as fast as it is formed. The porosity of the dressing is essential, and one of its fundamental characteristics. Ratynski believes the results to be equal to those secured by any other method. It is not stated whether any preliminary surgical treatment is given, nor the average time taken to produce a surgically aseptic condition of the wound.

Ichthyol and **Ichthyol with Glycerin,** invaluable in inflammatory conditions of wounds, glands, dermatitis, etc., are strongly and persistently advocated by Duggan[24] as an antiseptic in all gunshot wounds. Equal parts of ichthyol and glycerin are used as long as the wound is septic. About the fourth day of treatment the quantity of ichthyol can be reduced to 20 per cent.

Carbolic Acid and Camphor. — Friedman and Walton[25] have obtained very striking results from carbolic acid and camphor used as an antiseptic application in war wounds. Crystals of pure carbolic acid and an equal quantity by weight of camphor are rubbed together in a mortar, a sweet-smelling liquid being obtained. A surgical toilet is made and drainage provided. The liquid is poured in to reach the whole surface of the tissues. Drainage tubes are inserted and packed around with gauze soaked in the mixture. A few drops are poured down the tube every forty-eight hours, and fresh-soaked gauze is applied. The effects of the fluid in a fresh wound are to dry the surface, and later to produce a thin white slough. The slough dries and separates in a few days. When the wound is septic and pus is present, the drying process takes longer. Salines and other fluids should not be used during the treatment. The dressings are painless. Some smarting is felt at first, quickly giving way to carbolic anæsthesia. No secondary hæmorrhage and no cases of carbolic poisoning happened in a series of some hundreds of cases treated by this method. In a total of thirty-four septic gunshot compound fractures no deaths occurred, and no cases came to amputation. The introducers claim for their method that it overcomes sepsis more rapidly than any other method; amputations are less frequent; it diminishes rather than increases pain; dressings are infrequent. The antiseptic is well borne, and is practically non-toxic; it is suitable for transport cases. It reduces ward labour. Secondary suture does not appear to be part of the technique at any time.

Leclainche and Vallée[26] advise the application of a polyvalent serum, '**Valleé's Serum,**' to wound surfaces. They are convinced that it is an ideal dressing in aseptic wounds—after the necessary surgical toilet—in all cases that cannot be closed completely by primary suture. The serum being identical in physical and chemical properties with the exuding plasma, it forms a painless dressing, and

encourages rapid granulation and a supple condition of the wound edges. In infected cases, as a local application it exhibits its specific properties and stimulates physiological defence. Injected subcutaneously when infection is threatening or already established, it brings about a fall of temperature, with improvement in the general condition. Brazy[27] gives his support to the treatment by Vallée's serum of wounds that cannot be united at once by sutures. From this method he has obtained the best results.

The 'Flavine' Compounds.—The term flavine will here include the acridine group, diamino-methyl-acridinium chloride ('flavine' or 'acriflavine') and diamino-acridine sulphate ('proflavine'). Flavine has been recently introduced by Browning, Gulbranson, Kennaway, and Thornton[28] as a new antiseptic in the treatment of war wounds. They claim that it is distinguished above other antiseptics by its increased efficaciousness in the presence of serum, being about twenty times more powerful as a bactericide than mercury perchloride, and 800 times more powerful than carbolic acid or chloramine-T under such conditions. Flavine is reputed to kill cocci and *B. coli* at a concentration of 1–100,000, and not to affect phagocytosis at 1–500. It exerts a slowly progressive bactericidal action.

Fleming[29] disputes the claims of flavine to be an ideal antiseptic. His experiments satisfy him that its bactericidal powers have been exaggerated and based on fallacious experiments. He is convinced that its action on living tissues as exemplified by leucocytosis is far in excess of its lethal action on bacteria. Hewlett[30] also (acting independently of Fleming) finds by experiment the germicidal value of flavine is lower than that stated by Browning and collaborators. He questions the legitimacy of the inference that, since the germicidal power of flavine is increased in serum, the same should occur in pus. Clinically, applied as gauze soaks or used in irrigation, its introducers find it to be painless, without irritation, and without toxic effects, even when injected into the tissues. Granulations are stated to be of a good colour and texture, and healing is rapid. Ligat[31] confirms these clinical observations. Whenever septic wounds are irrigated with flavine 1–1000 in normal saline, covered with gauze soaks and protective, he finds there is a considerable decrease of pus after twenty-four hours.

Drummond and McNee[32] state that flavine does not sterilize recent wounds. Bacteria are found growing freely in flavine-treated wounds, but the *inhibiting action is effectual.* Recent wounds treated in an advanced surgical centre and in a casualty clearing station with gauze and flavine packing, remained free from clinical signs of sepsis for a considerable time. The wound surfaces become coated with a fibrinous membrane, due to a very superficial necrosis, when the antiseptic is in strength of 1–1000. In spite of the presence of bacteria there is a notable absence of inflammation and septic infection. In the cases observed there were no bad examples of gas gangrene, although anaerobic organisms were present in large numbers. In the

presence of flavine, healing by granulation was very slow; evidently the growth of granulations was checked by the application. They recommend the first dressing should be in the strength of 1–1000; subsequent dressings 1–5000; and when the Carrel modification of irrigation is employed, 1–10,000 is sufficient. Gauze packing can be left in the wound for several days without being changed. After the removal of the first dressing on the third day after Carrel-flooding and packing, no alteration in the appearance of the wound is observed, except some staining. The wound resembles an injury only a few hours old. There is no inflammation, no pain, redness, or swelling. and no induration. Very little secretion is seen. There is no suppuration even when organisms are abundant. At the end of a week the wound is still clean, but no epithelial growth is observed. The floor of the wound is covered by a closely adherent membrane. If flavine is continued the wound remains stationary. The indication, therefore, is to stop the flavine after three to four days in small wounds, and after seven days in severe wounds. The membrane is dissolved by eusol. Considerable quantities of flavine can be left in the abdominal and thoracic cavities without toxic effect. In thirty cases of primary suture, after surgical measures, all were successful but two, which broke down. In ten cases of secondary suture all were successful, although some were not sterile at the time of operation. The advantages claimed for flavine as a primary dressing are the following: absence of all toxicity; prevention of suppuration and spreading sepsis; the primary dressing need not be changed for two to three days; it is painlessly removed; the wounds do not become inflamed or painful; the skin is never irritated. Drummond and McNee do not find flavine a success in late stages.

Carslaw,[33] in treating twenty-two septic cases, some of them sloughing extensively, found, at the end of a period varying from three to seven days, all signs of inflammatory reaction in the surrounding tissues had disappeared. In many cases this change took place within the first three days. The general condition improved, and there was an extraordinary absence of pain. The sloughs had separated and discharge almost ceased. Newly-formed epithelium was rapidly growing. The wound was covered by a yellowish membrane. Under this, and between its edge and the growing epithelium, were small, firm, healthy pink granulations. No further appreciable changes took place when flavine was continued beyond this stage. Moist eusol dressings removed the yellow membrane within two or three days and produced bright-red granulations. In all but two of these cases bacteriological examination showed the organisms remained approximately constant, or there was an actual increase in the number of one or other of the bacteria present. Phagocytic activity was found in the yellow membrane. Carslaw is convinced that infected lacerated wounds respond much more rapidly to flavine than to antiseptics in common use.

Applications for indolent and sloughing wounds (pp. 15, 32, 59).

Bond[34] uses a paste of acriflavine made by neutralizing stearic acid with sodium carbonate in the proportion of 1 part of sodium carbonate to $1\frac{3}{4}$ parts of stearic acid, with the addition of 0·1 per cent acriflavine.

Brilliant-green, an antiseptic of the diamino-triphenyl-methane group, was brought forward by Browning and others[28] as a special antiseptic in war wounds when introducing the flavine compounds. They do not claim for brilliant-green the same ideal qualities they find in flavine, since its action is reduced in serum ; but in watery solution it is an extremely potent bactericide. Brilliant-green is said to kill cocci at 1–30,000, and only inhibits phagocytosis at 1–2000. It is less harmful to phagocytosis than malachite-green. A solution of 1–1000 normal saline produces granulations of an exuberant bright-red type and a vigorous epithelial growth very rapidly. It is practically non-toxic. The skin is rarely irritated. In 1–2000 solution it is superior to Dakin's solution for use according to Carrel's method with two-hourly flushing. Hot stupes of the same strength give exceptionally good results in acute septic compound fractures and amputation stumps. In burns, a combination of 1–2000 brilliant-green and the paraffin method give superior results. Brilliant-green has proved of great use in staining the tracks of missiles as a guide to excision of damaged tissue. In Hey's paste (*see* ' Secondary Suture ') it forms an important ingredient.

Rendle Short, Arkle, and King,[35] after many months' trial of this paste, find that it is non-poisonous and painless. In the great majority of their cases it almost completely sterilized the wounds in three days, so that secondary suture could be performed in severe injuries. They were able " with fair consistency to obtain healing within a fortnight, of cases of compound fracture even when complicated by joint injury, big buttock-wounds, and deep muscle wounds." Primary healing within a fortnight was obtained when an elbow-joint full of pus was excised. Some cases of large deep wounds suppurated after four or five days, suggesting that the original pasting is not effective after three days, and in such wounds repasting (under an anæsthetic) is necessary.

Gore-Gillow[36] claims that in **Acetozone** (benzol-acetyl-peroxide) he has found a general surgical antiseptic fulfilling many of the conditions of an ideal antiseptic. A solution of 5 gr. to the pint of cold sterile water may be used as a bath, or one-third hot water may be added to a 7-gr. solution. A 10-gr. strength is used for gauze soaks. He appends a report by Hewlett showing that acetozone is a potent disinfectant. " In saline mixtures it kills the staphylococcus in strengths of 1–600 in thirty minutes, and 1–4000 in twenty-four hours. The addition of serum and of broth reduce its germicidal power, but it is still effective in strengths of 1–437 and 1–744 respectively, with an exposure of twenty-four hours."

The search for an ideal general antiseptic for the treatment of wounds when infection is established has enormously advanced our methods of suppressing sepsis ; but it has produced no agent which, either pure or diluted, can inhibit or destroy *all* the different forms of bacteria without at the same time injuring the living cells engaged in the process of repair. This is leading to an ever-increasing conviction that this ideal will not be found in any one antiseptic. Kenneth Taylor[37] calls attention to the *specific action of antiseptics*, or, as he prefers to call them, 'dressing solutions.' Experimenting on wounds with various dressing solutions, he obtains definite effects on the bacterial flora ; but "these effects were evidenced in no case upon the bacterial flora *in toto*, but upon one or more species of bacteria at a time." He believes "that further analytical study of antiseptics will result in the discovery of dressings specific for one or more groups of bacteria. By a successive application of these dessings, organisms in a wound may be reduced in number or be eliminated one variety at a time, and true sterilization accomplished." From Kenneth Taylor's tables illustrating the selective action of antiseptics we may take carbolic acid, Dakin's solution, salicylic acid, and quinine, as examples of degrees of activity towards certain forms of bacteria. Carbolic acid proved more active against the streptococcus than against the staphylococcus ; it showed very little activity against the gas bacillus. Dakin's solution showed moderate activity against the staphylococcus, was nearly inert against *B. pyocyaneus* and the gas bacillus, but was more active against the streptococcus. Salicylic acid showed very little activity against streptococcus, pyocyaneus, or staphylococcus, but was fairly active against the gas bacillus. Quinine showed its greatest activity against the gas bacillus. The pyocyaneus is particularly resistant to most antiseptics. With regard to this resistance Kenneth Taylor[38] writes : "While this organism has never been the source of acute danger to the patient, its presence has seemed to retard the production of healthy granulations and impede the growth of new epithelium. It has been an organism difficult to eradicate by the use of most antiseptics. It was rarely an inhabitant of fresh wounds, but its incidence has increased after the first week following injury, and it has often remained the predominating infection." It is rarely present when wound secretions are acid. Clinically, he finds a 1 per cent acetic acid in physiological sodium chloride proves consistently active in ridding wounds of this organism.

Physiological Agents.—Bowlby[39] writes on the subject of sodium chloride : "The hypertonic salt solution has not proved successful at the Front, and at the present time is hardly used at all. The wounds treated by it were usually very slow in healing, and the granulations were generally pale, flabby, and much overgrown. There has also been a good deal of evidence to show that secondary hæmorrhage is not nearly so frequent an occurrence since hypertonic saline has been displaced by other antiseptics. This is not at all surprising when it

is considered that rapid cicatrization is the best safeguard against this complication." (For physiological and other methods of treating gunshot wounds, see the MEDICAL ANNUAL, 1917, p. 262).

On the use of **Alcohol** for the disinfection of wounds, etc. (p. 2).

SOME CONCLUSIONS.

1. Although it is unreasonable to expect any antiseptic used in first aid to sterilize completely a severe gunshot wound, there is evidence that certain applications exerting a continuous action can, in many cases, inhibit sepsis for a time sufficiently long to cover their removal to hospital and to avoid the necessity of changing or refreshing the dressings during transport. Of these applications Vincent's powder is perhaps the simplest, most portable, and convenient. Dichloramine-T, carbolic and camphor, and flavine gauze-packs are pronounced efficient, and are suitable. by reason of their painlessness, to be applied without increasing shock.

2. Early, deliberate, and complete surgical treatment is the basis of success.

3. Primary suture after an operation which anatomically reconstitutes the parts is the ideal method, but it can be performed only when circumstances permit the surgeon to work with deliberation, and the patient to remain under uninterrupted supervision for several days. When wound excision is made within a few hours of injury, antiseptics are not essential to success.

4. Secondary suture, when inhibitory or sterilizing dressings have done their work, offers almost as good results as primary suture, if the applications used do not delay deep union by interposing substances difficult of absorption between the wound surfaces.

5. Bacteriological verification of the absence of sepsis before making primary or secondary suture is not essential. Many experienced observers are guided entirely by the clinical appearance of the wound and the patient's general condition.

REFERENCES.—[1]*Lyon Chirurg.* 1917, Jan. and Feb., 35 ; [2]*Presse Méd.* 1916, Dec., 575; 1917, May 3, 251 ; [3]*Ibid.* 1917, April, 242 ; [4]*Brit. Med. Jour.* 1917, ii, 445 ; [5]*Lancet*, 1917, ii, 347 ; [6]*Med. Ann.* 1916, 682 ; [7]*Presse Méd.* 1917, Feb. 1, 65, May 3, 251 ; [8]*Brit. Med. Jour.* 1917, ii, 503, and *Brit. Jour. of Surg.* 1917, April, 659 ; [9]*Lyon Chirurg.* 1917, Jan. and Feb., 1 ; [10]*Surg. Gyn. and Obst.* 1917, i, 255, and *Rev. de Chir.* 1916, May, 637 ; [11]*Lyon Chirurg.* 1917, Jan. and Feb., 12 ; [12]*Lancet*, 1917, ii, 509 ; [13]*Brit. Med. Jour.* 1917, ii, 509 ; [14]*Lancet*, 1917, i, 333 ; [15]*Surg. Gyn. and Obst.* 1917, i. 285 (abstract) ; [16]*Jour. Amer. Med. Assoc.* 1917, i, 107 ; [17]*Ibid.* 1533 ; [18]*Ibid.* 1917, ii, 27 ; [19]*Brit. Med. Jour.* 1917, ii, 249 ; [20]*Jour. Amer. Med. Assoc.* 1917, ii, 53 ; [21]*Surg. Gyn. and Obst.* 1917, i, 108 ; [22]*Ibid.* 1916, Oct., 486 ; [23]*Presse Méd.* 1916, Nov. 30, 540 ; [24]*Jour. R.N. Med. Service*, 1917, July, 346 ; [25]*Lancet*, 1916, ii, 1043 ; [26]*Presse Méd.* 1917, April, 187 ; [27]*Surg. Gyn. and Obst.* 1917, i, 285 (abstract) ; [28]*Brit. Med. Jour.* 1917, i, 73 ; *Ibid.* ii, 70 ; [29]*Lancet*, 1917, ii, 341 ; [30]*Ibid.* 493 ; [31]*Brit. Med. Jour.* 1917, i, 78 ; [32]*Lancet*, 1917, ii, 641 ; [33]*Jour. R.A.M.C.* 1917, Oct., 488 ; [34]*Brit. Med. Jour.* 1917, ii, 6 ; [35]*Ibid.* 506 ; [36]*Ibid.* 209 ; [37]*Lancet*, 1917, i, 294 ; [38]*Jour. Amer. Med. Assoc.* 1916, ii, 1599 ; [39]*Brit. Med. Jour.* 1917, i, 707.

WOUNDS IN NAVAL ACTION. (*See also* GAS POISONING.)

Dep. Surg.-Gen. A. Gascoigne Wildey, R.N.

The reports of naval medical officers engaged in the battle of Jutland deal fully with preparations for action and experiences during and after the engagement. Maclean and Stephens,[1] of H.M.S. *Lion*, in their account of the general medical organization, describe the precautions taken against gas poisoning. Not only were respirators and anti-gas goggles provided, but the delivery openings of the ventilators in the ship's compartments were guarded by bags of loosely-packed shavings medicated in the same manner as the tubular respirator. Although there was considerable trouble on the mess-deck with smoke from burning débris mixed with T.N.T. fumes, no cases of gassing occurred, the simple respirators of gauze and waste proving efficient.

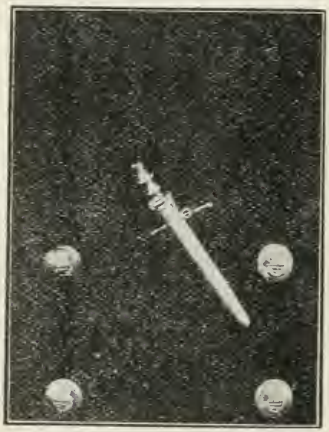


Fig. 118.—The naval pattern hypodermic syringe, attached to the coat front.

Fig. 119.—The syringe withdrawn from sheath.

In dealing with a large number of severely wounded on board ship, where of necessity they may have to remain in close company with the uninjured, the need for prompt relief from their sufferings is obvious. The importance of giving *maximal* doses of **Morphia** hypodermically is strongly emphasized; $\frac{2}{3}$-gr. doses relieved pain instantly and controlled hæmorrhage, whereas, in the experience of all the medical officers, small doses and morphia tablets under the tongue were almost useless. The naval-pattern syringe (*Figs.* 118, 119) carried ready for use in a metal scabbard fixed to the coat-front by a safety-pin attachment, and recharged through the rubber cap of an unspillable solution bottle, was found to be 'ideal' and 'most valuable' under the strenuous circumstances. This syringe was designed to meet possible emergencies of naval warfare where, as it was anticipated, the surgeon

might find he had little else to rely upon. Such an emergency occurred during the Jutland fight. It is interesting to compare the anticipation with the actual. In 1910, the designer, when introducing the syringe, wrote :[2] "Consider what these circumstances are likely to be, during or immediately after a big engagement afloat. The bowels of a battleship. The air—save the mark !—thick with the fumes and reek of the fight, and charged with solid particles dislodged by explosions or by the concussion of a parting shot at the enemy. Dim artificial light—perchance failure of electric circuits. The decks flooded by fire-hoses and, not unlikely, acutely inclined by the heeling of the ship with a damaged compartment, or rolling disabled in the trough of the sea. The traffic in the narrow passages congested with stretcher-bearers and their burdens—with wounded who are able unaided to seek the surgeons' quarters—all hustled by hose-parties rushing to extinguish an outbreak of fire. Then imagine the surgeons and their untried lay assistants—the chaplain and the paymasters—with (ordinary) syringes and stock bottles, pots, or ampoules, striving to fill instruments, and administer injections quickly and efficiently. It is more than probable the stock bottles will be upset or the solution fouled and the needles blocked, broken, or lost."

To-day, Penfold,[3] in a battleship, writes of his experience : "When the action commenced, all the arrangements in the dressing stations had been completed, the necessary instruments sterilized and laid out in trays, lotions made up, morphia solution in Jena bottles, etc., and the staff clean and ready for their work. Only one casualty had come to the fore station during the first hour of the action, and this had been dressed ; the man would have been sent back to his post, but just after dressing his wound a heavy shell burst close to us in the fore part of the ship and completely wrecked the dressing station and medical store, causing many casualties in this part of the ship. On recovering from the effects of this explosion, it was found that all the lights were out in our compartment, which seemed to be filled with débris, and the air thick with smoke from the adjoining store-room, which was on fire, but no flash had been felt and no nitrous fumes were noticed : water was rushing in (from burst pipes), and the compartment was quickly flooded ; the injured men were crowding towards the corner of the compartment where there was some light from the deck above coming through the hatchway. Surgeon Margets and myself were practically uninjured, and were able at once to attend the wounded, with the assistance of one sick-berth attendant (who was afterwards found to be slightly wounded in the leg by a shell splinter) ; the other two sick-berth ratings stationed with us were both found to be seriously wounded, and one died shortly afterwards. Very little in the way of dressings was salved from the distributing station or medical store, as what was not destroyed by shell explosion or fire was damaged by water ; so that at first only temporary dressings which could be obtained from the nearest guns or isolated positions were available." The service-pattern syringe and

bottle of morphia solution which were carried by the medical officer had not been broken, "and at first none other was available, all the other hypodermic syringes and prepared solutions of morphia having been destroyed." This was not the only ship in which the surgeons worked under great difficulties. Forty-four per cent of the medical officers and sick-berth staff were casualties on H.M.S. *Lion*.

For the transport of wounded from difficult places the Neil-Robertson stretcher (*Plate LVII*) proved thoroughly satisfactory. This stretcher embraces the limbs. It was found to act admirably in lieu of splints in seven cases. The battle was broken off and renewed several times over a period of many hours, so that it was at least sixteen hours before the wounded in H.M.S. *Lion* could receive operative treatment on board. Fifty-one cases were dealt with; twenty-eight under a general anæsthetic. Only urgent operations were attempted. In this ship **Eusol** was the chief antiseptic employed. A very large proportion of the cases, including many very severe and multiple injuries, ran a course free from sepsis.

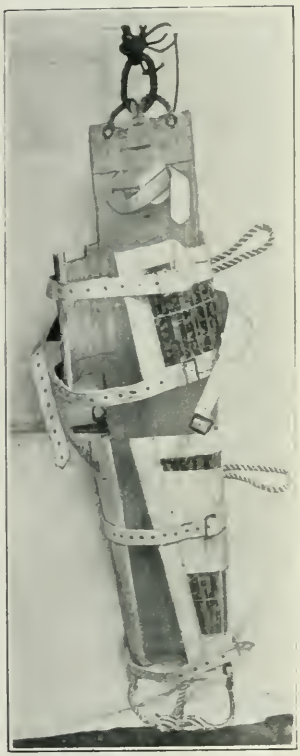
Burns formed a large proportion of the casualties. When due to cordite fires the injury was very severe and fatal. The less extensive burns, caused by the flash of high explosives in confined spaces, were limited to face, hands, and ankles—parts exposed to the momentary flame. It is noted that the eyes always escape injury although the lids are often severely burned. (The experience gained in this action has led to the supply of masks, gauntlets, and thick clothing for the protection of gun's crews, etc.) **Picric Acid** gave satisfaction as a first-aid application in the lesser cases. For severer burns and for second dressings a mixture of eucalyptus and olive oils found favour. (**Ambrine** is now supplied to the Naval Service.)

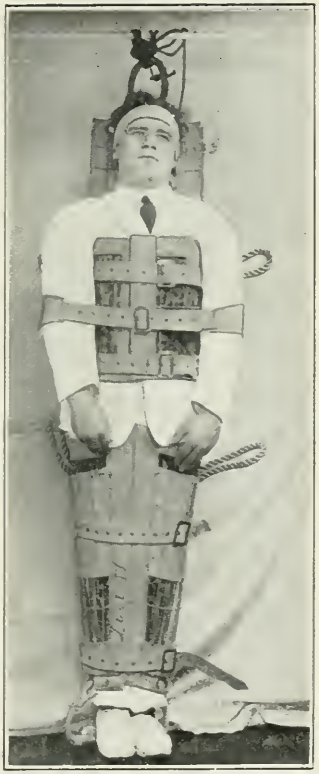
When wounded can be transported to a base within three days of injury, operative treatment can be delayed, in most cases, until their arrival in hospital or hospital ship. If a reliable continuously-acting antiseptic has been applied in the form of a dressing that does not require to be renewed or refreshed during transport, and the wound left unclosed, there is every prospect of a *complete* operation performed within this limit of time securing aseptic healing by first intention. All surgical requirements are provided on the warships, and many of the surgeons are experienced operators, and afterwards there is little risk of severe forms of sepsis; but the number of wounded to be dealt with makes it impossible to perform on board such thorough surgical measures, in all cases, as would justify primary suture in the severer wounds. The writer, in an overseas hospital receiving cases of high-explosive shell wounds from engagements with submarines, finds that even when first aid has been of the simplest kind, sepsis is rarely evident within forty-eight hours, and up to that time, and even later, aseptic results and primary healing may be expected after thorough surgical treatment.

References.—[1]*Jour. R.N. Med. Service*, 1916, Oct., 421; [2]Report of Annual Meeting British Medical Association, 1910, *Brit. Med. Jour.* 1910, Oct.; [3]*Jour. R.N. Med. Service*, 1917, Jan.

PLATE LVII.

THE NEIL-ROBERTSON STRETCHER





The second figure shows the stretcher in operation and the method of suspension. Lateral rope handles are seen projecting from the side. Owing to the wedge shape, no weight is transmitted to the feet in the vertical position.

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YAWS.

Formula for the employment of **Tartar Emetic** (p. 31).

YELLOW FEVER. *Sir Leonard Rogers, M.D., F.R.C.P.*

H. R. Carter[1] discusses the question of the spontaneous disappearance of yellow fever from failure of the human host. He maintains that, as an attack of yellow fever produces in general a permanent immunity, in time no susceptible people will remain, and then, as soon as the infected mosquitoes die off, the parasites disappear, and the disease cannot recur unless it is introduced again from without. He thinks the disease had died out in this way from many places, and with improved sanitation there are fewer foci left from which infection can be introduced, so the disease may in time be completely eradicated. In the discussion on his paper most of the speakers took a less sanguine view of the position.

Reference.—[1]*Trans. Soc. Trop. Med. and Hyg.* 1917, June, 119.

Part III.—Miscellaneous.

PUBLIC HEALTH:

INCLUDING

I. MEDICO-LEGAL AND FORENSIC MEDICINE.
II. STATE MEDICINE, INCLUDING LEGAL DECISIONS.
III. INDUSTRIAL DISEASES AND TOXICOLOGY.
IV. SCHOOL MEDICAL SERVICE.

EDITED BY JOSEPH PRIESTLEY, B.A., M.D., D.P.H.
Medical Officer of Health, Metropolitan Borough of Lambeth.

I. MEDICO-LEGAL AND FORENSIC MEDICINE.

ANTHRAX AND SHAVING-BRUSHES.

An interesting report has been issued by the Local Government Board on cases of anthrax due to the use of infected shaving-brushes, some of which, on bacteriological examination, showed the presence of the anthrax germ. The brushes were made of imitation badger-hair, and were traced back to one wholesale dealer, the brushes being made in a single factory. The imitation badger-hair was found to consist (mostly) of Chinese horsehair, which had not been disinfected prior to being manufactured into brushes. The large majority of cases were external anthrax of the face and neck.

REDUCED 'WAR' LIGHTING AND A CLAIM FOR DAMAGES.

A claim for damages was brought against a Corporation by reason of damage to an eye caused by an iron spike fencing round a tree planted in the footway. The plaintiff was awarded £660 damages and costs, the sight of the eye being destroyed as the result of the accident. The Corporation appealed, on the ground that the tree guards were admittedly safe in normal times and under normal conditions, and that the 'War' Lighting Order, under which the town was placed in a state of darkness, did not impose upon the Corporation any further precautionary measures. The appeal was dismissed, the court holding that the matter of reasonable care was one for a Jury to decide, and, in the particular case under consideration, the Jury had decided in the negative.

WORKMEN'S COMPENSATION ACT.

New Temporary Workmen's Compensation Act.—On Sept. 1, 1917, the new Workmen's Compensation (War Addition) Act 1917 came into force, and will continue in force until six months after the close of

the War. Any person liable to pay compensation will be required to contribute an additional sum equal to one-fourth of the amount of his present liability. No additional premium will be charged in the case of domestic servants (indoor or outdoor), but for other employees an additional premium of 10 per cent.

Return to Work: Legal and other Impediments.—Sir John Collie, M.D., than whom a greater authority on the subject does not exist, has recently pointed out two circumstances in which difficulties might arise in connection with an injured workman on returning to work, viz.: (1) Where new and unthought-of symptoms declare themselves after return to work and are due to the injury from which the workman supposed he had wholly recovered; (2) Where a man, having had an injury and having admittedly not fully recovered, returning to work, receives (but does not earn) his full wages, and then again breaks down, or who still has an obvious physical disability, although earning full wages.

A return to work, provided that the employer has had notice of the accident, cannot affect a man's right to compensation if he is, in fact, afterwards found to be incapacitated as a result of the accident. On the other hand, a delay in resuming work may prove prejudicial to the workman's right to compensation (see Turner *v.* Brooks & Doxey Ltd., in which, on appeal, the County Court decision was upheld, viz., that the workman's refusal to work—a refusal due to nervousness—was unreasonable, and compensation was, in consequence, not allowed). The Workmen's Compensation Act only gives a workman right to compensation in respect of wages which he is unable to earn as a result of an accident. A workman's interests can be protected in the County Court, after an injury, by filing in the court a declaration of liability or a memorandum of agreement. By this means, the fact of an accident having happened is recorded and the workman's right to compensation thereby kept alive, a nominal sum of one penny a week as compensation being usually agreed. Such an agreement is recognized by the Workmen's Compensation Act.

Notice of accident must be given to the employer as soon as practicable after the accident and before the workman has voluntarily left the employment in which he was engaged at the time it happened; and, further, any claim for compensation must be made within six months from the date of the accident. The notice of accident and the claim for compensation are two separate and distinct things.

Precipitin Test for the Detection of Human Blood.

The precipitin test for the detection of human blood is highly specific—anti-human serum even in as low a dilution as 1–100 only causing a reaction in the presence of human blood or that of certain higher types of apes. Dilutions of the anti-human serum of 1–1000, 1–5000, and 1–10,000 are reliable. In the case of the higher types of apes, the reaction does not appear until after twenty minutes, whereas in human blood the reaction sets in forthwith (well established within five minutes)—a differential diagnosis that may be needed in certain extreme cases or in foreign countries where such apes abound.

What is the nature of the precipitin test? It was first described by Uhlenhuth in the following detailed method: rabbits were injected

with about 10 c.c. of human defibrinated blood at intervals of from six to eight days until five injections had been made, and this resultant modified rabbit serum, when added to a solution of human blood (1–100) mixed with an equal part of a double normal (1·6 per cent) salt solution, caused a distinct cloudiness, normal rabbit serum not causing any such reaction. The suspected blood must be proved, in the first place, to be blood by the usual tests, viz., the well-known guaiacum test, the discovery of hæmin crystals under the microscope, the presence of the usual blood lines in the spectroscope, etc. The *human* origin of the blood can then be proved by the use of Uhlenhuth's humanized rabbit serum, or anti-human serum as it is called, the only element of doubt being, as stated above, in the case of blood from certain species of the highly-organized apes, when the reaction is delayed, not appearing until after twenty minutes. The need for the preliminary blood tests will be admitted when it is remembered that human semen, albuminous urine, ascitic fluid, etc., will, naturally, all give the precipitin test for human albumin, which is a constituent (but only one constituent) of human blood as well as of other human fluids. Physiological salt solution only should be used as a solvent and diluent for blood stains, etc., and the dilution should be about 1–1000, to secure which the following directions are necessary: (*a*) The dilution to be almost completely colourless by transmitted light; (*b*) The dilution to give only a slight cloud on heating with a few drops of nitric acid; (*c*) The dilution to foam freely on shaking; (*d*) The dilution to be crystal clear, and, for that purpose, to be filtrated if necessary. The precipitin test appears to be due to a change of the electric potential of the albuminous molecules of the diluted serum, such molecules (being colloid) being in a state of suspension in the dilution.

II. STATE MEDICINE, INCLUDING LEGAL DECISIONS.

Ministry of Health.

All administrative sanitarians agree that the suggested establishment of a Ministry of Health is an *ideal*, but the Medical Officers of Health Society goes further and expresses the opinion that such an ideal should materialize forthwith, so as to stop the present wasteful and inefficient system, by which the responsibility for the protection of the nation's health is divided up centrally amongst so many different Government departments, and locally amongst various mutually independent public authorities. Unification of control of all machinery is much needed, whether such machinery be administrative or executive, central or local, as it is for the maintenance of the health of, and the provision of treatment for, the people. Consequently, every effort should be made to bring about such a reform, and a commencement should be made forthwith, even though national war conditions prevent the scheme being realized in its entirety. What is wanted is an efficiently constituted central department, to which all matters affecting public health should be specially referred, thereby placing the health administration of the country upon a sound basis, by co-ordinating the various Government and other departments that are at present engaged upon such an important

subject. Thus, the Ministry of Health would include amongst its functions the following :—

1. Provision of sanatoria and treatment of tuberculosis.
2. Provision of isolation hospitals and measures to be taken against the spread of infectious diseases.
3. Venereal diseases, their prevention and treatment.
4. Administration of the Vaccination Acts.
5. School hygiene, medical inspection and treatment, and the carrying out of the Children's Act.
6. Supervision of State-provided medical services, and of State-provided, or State-supported, institutions.
7. Maternity and child-welfare work.
8. Supervisory control of the Central Midwives Board and the administration of the Midwives Act.
9. Medical research, including provision of laboratories.
10. Care of water supplies, and the control of the sources, gathering grounds, and distribution.
11. Housing and town planning.
12. Sewerage and drainage, abatement of nuisances, and the kindred duties generally carried out at present by Local Sanitary Authorities.
13. Supervision of ship sanitation and hygiene, including the sanitary control of emigrants and immigrants.
14. Milk supply and other food inspection.
15. Factory and workshop inspection as regards sanitation and hygiene, including hours of work, factory-welfare work, and prevention of anthrax and other communicable industrial diseases.
16. Compilation of vital statistics, including the registration of births, marriages, and deaths.
17. Promotion of public health legislation and codification of the laws relating to public health.

Year by year, extra duties are being given to local sanitary authorities—duties of a medical character such as those in connection with the establishment of infant-welfare centres, school clinics, tuberculosis dispensaries, venereal diseases institutions, etc., so that the present time would seem to be opportune for a still further extension of such medical duties and powers in the direction of an increased provision of medical treatment, or the inauguration of a State Medical Service, as a part of the general public-health organization of the country. Public health work certainly embraces *all* measures, whether of prevention or treatment, which will diminish or curtail the duration of the disease, or which will raise the standard of health of each member of the community ; consequently, *clinical* medical officers should be members of the staff of the chief administrative medical officers, so as to avoid all danger of dual control being established, such a dual control being wrong in principle. No independent *clinical* medical departments should be formed. As it has been well and pithily stated, the first duty of the State is to prevent disease, failing that to cure disease, and failing that to prolong life and relieve suffering. It is clear that prevention and treatment must go hand in hand as part and parcel of the same administrative whole.

When the Ministry of Health is appointed, the administrative units should be properly elected representatives of the people, and not drawn (in part or wholly) from organizations financially interested in their own particular proposals. The Local Government Board

might be reorganized so as to become the one central health authority, and the present local sanitary authorities are capable of carrying out any increased duties imposed upon them by Parliament. The Poor Law Administration might, with advantage, be separated from the Local Government Board when, and if, re-organized as a Health Ministry.

Food Economy and Rationing.

Compulsory rationing has proved a failure in Germany, owing to the difficulty of adjusting distribution to individual needs. Different workers require different amounts of rations. Still, rigid economy is an absolute necessity, having regard to the 'harvest' stocks and the persons to be fed. Actual world shortage of food (cereals and meat) and shortage of tonnage both exist. Rice, barley, oats, rye, maize, etc., are coming into more general use, either alone or mixed with wheat in the making or flour and bread.

The human body is a machine, and the energy output is pro rata to the fuel consumed. Manual workers require more than sedentary—3000 to 5000 calories as compared with 2000 to 3000 (roughly).* These amounts are likely to be reduced by rationing, and trouble may be the result, especially in the reduction of animal proteid. A reduction in the meat must be made up for by an increase in potatoes, fish, cheese, and milk, if the two last-mentioned are available. A pound of potatoes equals 427 calories. Compulsory rationing will not prove the panacea that some people think, but may lead to injustice and inequalities, unless the compulsory rationing be pro rata to the energy outputs required in individuals. Potatoes form a palatable, nutritious, and varied diet, whilst fish, as a substitute for meat (in part), is valuable, sprats, mackerel, and herrings heading the list in nutritive values. Rice, cheese, peas, beans, and nuts have high food values. Speaking generally, and allowing for defective absorption and imperfect oxidation, the heat (or energy) values of 1 grm. (15½ gr.) of proteid, carbohydrate, and fat are respectively 4, 4, and 9 calories (average). The food value of any particular food can be easily arrived at, and expressed in calories, by chemically examining such food and finding out the percentage of its nutritive constituents (in grammes) and multiplying each constituent by its above-mentioned average calorie value and adding them all together. The foods must, naturally, be digestible and absorbable. Tissue-formers or -repairers are the proteids (casein, myosin, gluten, and legumin), mineral matters (sodium, potassium, lime, phosphorus, and chlorine) and water; whereas the heat- and energy-producers are the albuminoids (gelatin), carbohydrates (sugar and starch), and fats (butter and olive oil), as well as proteids also, and probably mineral matters and water. Foods and food values must be understood, not only in regard to their nutritive constituents and their calories, but also in regard to their digestibility (or power of absorption by the human digestive tract) and their

* One calorie in mechanical energy is 3077 foot-pounds, so that 3000 calories would yield 9,231,000 available foot-pounds of energy—less than one-sixth transformed into work and the rest lost in the form of heat. The work energy represents (roughly) the raising of the body-weight to a height of 10,000 feet.

economies. A dinner at the Ritz Hotel at 10s. 6d. per head is one thing, but far better food values may be obtained at Lockhart's for 10½d. per head, or for less than that at home.

A mixed diet is a *sine qua non*, physiologically. The majority of people eat too much : indeed, it may be said that to eat enough (for healthy maintenance of life) is to eat too much ! Reserves must be ready, to be drawn upon at any time. In times of peace it does not much matter, but in times of war, at least for the civil population, there must be no overfeeding, and, if necessary, this condition must be enforced by compulsion or other drastic methods. Every adult member of the civil population must be underfed, and the greatest values from various foods must be obtained. To ensure this a scientific knowledge of food values must be imparted to the people, whose ignorance on the subject, at the present time, is great. Such knowledge will be found of use during the 'shortage' times in which we must live, if the war continues, and so long as it continues, as well as for many years afterwards, and it is to the medical profession that we must look for the imparting of this knowledge to their patients and the counteracting of the well-known existing fallacies on the subject of foods.

No article dealing with 'war rations' would be complete without a reference to the *expert* opinion as to the bad effects (if any) of war bread on health and its proper estimate as an important part of diet. Millers require to extract 81 per cent of the whole-wheat grain in the form of flour instead of the pre-war 70 per cent—the 11 per cent difference being made up from the bran (or pericarp) and the germ (or young plant). This new milling gives the 'G.R.' flour, against which many complaints have been raised on the score of ill-health, alleged as the result of its consumption, although, chemically, this 'G.R.' flour is richer in proteids, fat, mineral matters, and vitamines. The 'G.R.' flour must be from well-milled, properly-cleaned grain. Further, the Food Regulations allow millers to mix this new 'G.R.' flour with other cereals, e.g., maize, barley, rice, and oats, in certain proportions. This mixing of cereals is *voluntary*, at present. Bread made from 'G.R.' flour is darker in colour, and less porous (due to diminished gluten), with, in certain extreme cases, a tendency to 'ropiness' (due to a *Bacillus mesentericus*) with acid-fermentation. This last-mentioned objection (ropiness and acid-fermentation) is now practically a thing of the past.

What ill-effects (if any) have arisen or are likely to arise from the consumption of this war bread ? The *expert* opinion is definite on the point—the answer to the above question being, 'None.' Disorders of the digestive system have been reported by medical men from different parts of the country from time to time ; but it is probable that it is 'fancy' that plays the chief part with these complaining patients—at least, in the large majority of cases, the small minority (very small) being due to individual idiosyncrasies. War bread is improved by toasting, and should be carefully masticated. The pre-war white flour is less nutritious than the war coloured flour, but appeals more to the eye of a dyspeptic ! In medical language, the war flour contains more lime salts, more fat, is richer in vitamines of the thermostable class, and contains a greater variety of proteids, which, in their turn, provide a wider selection of amino-acids for

tissue nourishment. In other words, war flour (and, as a corollary, war bread) is a good and wholesome article of diet, and the medical profession would be wanting in its duty if it does not explain the real state of affairs to its patients and to the public generally as opportunity offers. When comparison is made between the war bread and flour as supplied to Britain and that supplied to other belligerent countries, there is justifiable reason for praising the British millers and bakers, who are doing their best under present disastrous war conditions. Let praise be given where praise is due, and what is even more important, let the scientific facts be known to all as to the value from a health point of view of war bread and flour—their food values and their wholesomeness.

Infantile Mortality.

'Baby Week' was held July 1 to July 8, 1917, and much public attention was given to the subject of babies and the necessity for saving their lives. The War, too, has also focussed public attention upon the matter. The nation's responsibility in connection with infant life is now acknowledged, and Government departments are doing all they can to assist and encourage local sanitary authorities in preparing and inaugurating maternity and child-welfare schemes throughout their respective districts. Pre-natal care, natal care, and post-natal care are all important for the infants as well as for the mothers, to be followed by close attention to the infants and young children until they arrive at school age (five years), when they pass under the care of the educational authorities. Voluntary agencies as well as sanitary (health) authorities (and the State itself) must help. Poor Law authorities also help in saving infant life—a fact that must not be forgotten. Grants in aid are given to both voluntary agencies and sanitary authorities by the Local Government Board and the Board of Education, and the Notification of Births (Extension) Act, 1915, made it very clear that local health authorities can provide out of the rates medical and nursing assistance before, at, and after the birth of a child. Health visitors are being appointed in large numbers, and antenatal and infant clinics, infant consultations, day nurseries, and schools for mothers are being inaugurated on all sides. Much good must accrue as the result of the nation's awakening to the need for the saving of child life.

Housing of the Working Classes.

After, and as a direct result of, the War, the housing question will take on an acute stage, and the Local Government Board, fully alive to this fact, has circularized the local authorities of England and Wales during 1917, pointing out the pressing need for houses for the working classes being provided, and expressing the opinion that private enterprise will be quite unable to grapple successfully and speedily with the work required, and that, consequently, local health authorities will have to take the matter up—suitable financial assistance from public funds to be available for such authorities as are prepared to carry through, without delay, at the end of the War, a programme of housing that is approved by the Board. The form or the extent of this financial assistance is not stated, but what is

stated is a decision of the Government that such assistance will only be available for a limited period.

Official forms have to be filled in and returned to the Board by local authorities—both those which are of opinion that housing needs exist in their respective areas, and those which are not. In any case, private enterprise will have to co-operate, and, for that purpose, should be assisted financially by the Government, but in an indirect manner, e.g., loaning of money at low rates of interest and for extended periods of time, lessening the stringency of building bylaws (if found to be necessary), etc.

All are agreed as to the scarcity of houses for the working classes that exists in various parts of the country, especially rural districts; on the other hand, the importance of adopting a policy of conservatism (used in its non-political sense) in regard to the housing question in connection with existing houses cannot be gainsaid—such a policy reducing to a minimum the inconvenience to tenants in the way of displacement and preventing overcrowding in other immediate neighbourhoods, with subsequent and consequent slum-making. This conservatism consists in remodelling and reconstructing existing old houses, so as to render them suitable for occupation by different families, each family to be separately catered for in the way of provision being made for separate living and sleeping accommodation, sculleries, sinks, water supplies, sanitary conveniences, etc., i.e., the provision of separately contained flats or tenements. Powers to do this are given to sanitary authorities under Part III of the Housing of the Working Classes Act, 1890.

Existing shortage of working-class dwellings in various parts of the country due to the cessation of building and to the difficulties in obtaining an adequate supply of building materials during the War, will cause a crisis in the housing question, and this crisis will have to be dealt with after the War, when there will also be a difficulty in obtaining an adequate supply of building materials. The importance of reconstructing and adapting *existing* houses must not be overlooked in the excitement that will, necessarily, take place amongst local authorities in connection with the provision of new houses on the lines of the Local Government Board's circular letter, with financial assistance foreshadowed from the Government.

Zinc-contaminated Water Supply as a Danger to Health.

A small military depôt was found to be depending upon a water supply containing 3·44 parts of metallic zinc per 100,000. A close supervision was kept over the supply and over the 200 men who had used it, as their sole drinking supply, for two years. The health of the 200 men had been excellent with the exception of one small outbreak of colic and diarrhœa (nine men only affected). The water is obtained from a shallow well situated on a knoll in the midst of cultivated clay soil about 1000 yards from the depôt. The well is 30 ft. in depth, and contains from four to six feet of water, which is pumped by means of a windmill through 1000 yards of galvanized-iron piping to a reinforced concrete tower (capable of holding two days' supply), from which it passes to various distributing centres through galvanized-iron service pipes. The water in the well is free from zinc, neutral in reaction, contains two to three parts of free CO_2

per 100,000, and shows only two parts of temporary hardness out of a total figure of nine. Experimentally, the water was found to have a considerable zinc-solvent power, the zinc being held in solution as a bicarbonate. The well-water was also found to have a considerable bacterial solvent power—32 colonies on agar in forty-eight hours at 37° C., and 109 colonies on gelatin in seventy-two hours at 22° C., together with lactose-fermenters (with MacConkey's bile-salt lactose broth) in from 0·1 c.c. to 1 c.c. These bacteriological results were considerably lessened when the experiments were made with the well-water as distributed in the depôt, i.e., after taking up about 3·44 parts of zinc per 100,000—the growth of organisms flourishing at blood heat being inhibited, especially those fermenting lactose, but those growing on gelatin being but little affected. These bacteriological results were pro rata according to the increase in the amount of the zinc taken up by the water.

What about the health of the 200 men who drank regularly the zinc-contaminated water for a period of two years? No disturbance of health resulted. Further, in one household, a persistent condition of ill-health, attributed locally to a contaminated water supply (bacteriological contamination), disappeared coincidently with the laying on of the zinc-contaminated water supply! These results were confirmed in the laboratory with water experimentally contaminated with definite proportions of zinc (as sulphate), the experiments showing: (1) That 1·5 parts of metallic zinc (as sulphate) per 100,000 renders water practically sterile in forty-eight hours; (2) That 3 to 4 parts of metallic zinc (as sulphate) per 100,000 appear to be sufficient, after twenty-four hours' contact, to inhibit, if not destroy, coliform organisms in numbers considerably exceeding those likely to be found in any ordinary drinking-water; (3) That the use of water containing zinc naturally in solution as a bicarbonate shows analogous results.

LEGAL DECISIONS.

The following legal decisions, published during 1917, *are important in their relation to State Medicine and Sanitary Administration :—*

Adulteration of Food and Drugs.

Cox v. *Evans* (*King's Bench Division*).

Sale of Food and Drugs Amendment Act, 1879, s. 3—*Course of delivery of sample of milk.*

A milk contract was made for delivery of pure milk at a railway station, the arrival of the milk at the said station to constitute delivery by the vendor to the purchaser. Under this contract a churn of milk was delivered at the station, but was retained by the police for a period of twenty minutes before being given over to the consignee. Meanwhile, an inspector under the Sale of Food and Drugs Acts took a sample, which was, afterwards, returned by the public analyst as "adulterated with 18 per cent of added water." Was the sample taken in course of delivery under the terms of the contract? The Magistrates held that it was, and on appeal this decision was affirmed. *Appeal dismissed.*

Pugh v. *Williams* (*King's Bench Division*).

Sale of Food and Drugs Act, 1875, s. 25—*Warranty may cease on the arrival of milk at a station.*

Milk arrived at a station and was claimed by the consignee three hours after its arrival. A sample was taken afterwards and found to be deficient in milk fat to the extent of 8 per cent. A warranty was produced from the farmer, guaranteeing the purity of the milk up to its arrival at the station, and, in consequence, the Magistrates refused to convict. On appeal, the case was remitted to the Magistrates for conviction, on the ground that no evidence was produced to show that the milk had not been tampered with in the interval between its arrival at the station and its being taken away by the consignee to his shop, and the warranty could not be pleaded.

Appeal allowed.

Bowen v. *Jones* (*King's Bench Division*).

Sale of Food and Drugs Act, 1875, s. 6—*Evidence of non-interference must cover the whole period from milking to selling.*

A sample of milk was taken and found to be deficient in milk fat (2·84 per cent instead of 3 per cent as laid down by the Milk Regulations). The defendant pleaded non-interference with the milk since it was milked from the cow, and produced evidence to prove his plea. The Magistrates were not satisfied with the whole of the evidence, and consequently convicted. On appeal, the Magistrates' conviction was upheld.

Appeal dismissed.

Robinson v. *Newman* (*King's Bench Division*).

Sale of Food and Drugs Act, 1875, ss. 6, 18, 21—*Analyst's certificate —Analyst's observations (on certificate) to be admitted as evidence.*

A sample of vinegar was purchased and found, on analysis, to be deficient in acetic acid to the extent of 27·2 per cent of the minimum quantity which normal vinegar contains, viz., 4 per cent. The analyst made a statement or observation on his certificate to the following effect: "Normal vinegar contains at least 4 per cent of acetic acid," thereby setting up, for the purposes of the particular analysis, a standard. The statement or observation went on as follows: "This sample, therefore, is deficient in acetic acid to the extent of 27·2 per cent of the minimum quantity which normal vinegar contains. This is equivalent to the presence in the sample of 27·2 per cent of excess water." No official or legal standard is prescribed for acetic acid in vinegar, and consequently the Magistrates dismissed the summons; but, on appeal, the case was remitted to the Magistrates with a direction to them to convict, on the ground that the analyst was entitled to insert on his certificate the statement or observation.

Appeal allowed.

Elder v. *Bishop Auckland Co-operative Society Limited* (*King's Bench Division*).

Sale of Food and Drugs Act, 1875, s. 25—*Warranty without any specified place of delivery—Misuse of limited authority to sell.*

A milkman contracted to serve the society with pure milk, but no place of delivery was mentioned in the contract or warranty. The

milk was for sale amongst the members of the society. A consignment was sent to a place called Ferryhill, where it remained for three hours before being claimed by a representative of the society, who then sold a portion to the sanitary inspector's deputy, such portion being found, on analysis, to be adulterated by the addition of extraneous water 6·24 per cent and a deficiency of milk fat 49·34 per cent. The Magistrates dismissed the summons, on the ground that the society's representative had acted *ultra vires*, outside the scope of his authority to sell, and that the warranty did not cover the three hours during which the milk was waiting at Ferryhill. On appeal, the case was sent back to the Magistrates with a direction to convict, it being *held* that the society's representative had only a limited authority to sell, which he had misused, and that the society had given no evidence as to what happened to the milk at Ferryhill station, the place of delivery. *Appeal allowed.*

Criminal Law.

Rex v. *Robinson* (*Court of Criminal Appeal*).

Criminal Appeal Act, 1907, s. 9—*Order* 58, r. 4—*Murder—Evidence admissible on appeal on matters occurring after conviction.*

Held, that the Court of Criminal Appeal has power to receive evidence of matters, which are relevant to the issue, and which have occurred since the time of the conviction appealed against. *Application dismissed.*

Drains and Sewers.

Morris v. *Mynyddislwyn Urban District Council* (*Court of Appeal*).

Public Health Act, 1875, ss. 13, 19, 23, 36—*Drain or sewer—Negligence in construction—Responsibility of local authority.*

A notice was served under Sections 23 and 36 of the Public Health Act, 1875, to enforce the provision of a w.c. and a drain connected therewith, but no conditions as to construction, materials, etc., were laid down by the surveyor to the local authority. This notice, and other similar notices in connection with adjoining premises, were served upon the owners of such premises, and they carried out the necessary work under the supervision of the local inspector of nuisances—the drain, which, as it drained more than one premises, was legally a 'sewer,' being reconstructed so as to be partly above ground, and so as to be a danger to the occupants of one of the premises. As a fact, an injury to one of the occupants of the premises resulted, and a claim for damages was made against the local authority for negligence. The Judge non-suited the complainant on legal points, although the Jury found in favour of the complainant and even assessed the damages at £40 (with £33 12s. costs) against the local authority. The *legal* grounds for the Judge's decision were (1) That the work was not carried out on the instructions of the Local Authority, or a Committee, upon the report of the local surveyor, and that the supervision by the inspector of nuisances was *ultra vires* ; and (2) That, in law, a local authority is not answerable or liable to occupants of premises through which a sewer (ill-constructed and in a dangerous condition, consequently) may pass.

Against the Judge's decision an appeal was lodged but was dismissed, and the Judge's decision confirmed. *Appeal dismissed.*

Housing and Town Planning.

Broadbent v. *Rotherham Corporation* (*Chancery Division*).

Housing, Town Planning, etc., Act, 1909, ss. 17, 18—*Closing order followed by demolition order—Refusal by local authority of application by owner for postponement—Injunction granted.*

Closing orders were made under the Act in connection with certain houses and specifications prepared of what was necessary to render the houses fit for habitation. The plaintiff (owner) appealed to the Local Government Board, but the appeal was dismissed. No application was made by, or on behalf of, the owner for the specifications that had been prepared, and the local authority, consequently, made the necessary demolition orders as required by Section 18 of the Act. The owner then decided to put the premises into proper order and condition, and so informed the local authority, which decided that the houses must be pulled down, as they could not be rendered fit for habitation. An injunction was applied for by the owner, and granted, on the ground that the local authority had not properly exercised its discretion under Section 18, Subsection 3, of the Act, so as to afford an opportunity of the owner suggesting certain works by which, if approved, the houses would be rendered fit for habitation. *Injunction granted.*

Nuisances.

Rhymney Iron Co. v. *Gelligaer Urban District Council* (*King's Bench Division*).

Public Health Act, 1875, s. 94—*Service of notice on owner, where person causing the nuisance cannot be found—Meaning of words 'cannot be found.'*

In connection with a nuisance from a stopped drain, notice was served upon the owners and not upon the persons by whose acts, defaults, or sufferances the nuisance arose or continued, on the ground that the latter 'could not be found' on mere inspection. The Magistrates convicted the owners, and, on appeal, this conviction was upheld, a mere inspection satisfying the legal interpretation of the words 'cannot be found.' *Appeal dismissed.*

III. INDUSTRIAL DISEASES AND TOXICOLOGY.

Occupational War Diseases.

The War has necessitated new occupations, and new occupational diseases have arisen and new industrial dangers to health (and life) have cropped up. Preventive measures have resulted and welfare (munition workers) departments been instituted. These industrial dangers to health (and life) may be classified under two main groups : (1) Physical and nervous ; (2) Toxic and explosive.

1. The first group deals with muscular and nervous strains, to which workers are subjected day by day and hour by hour, e.g., in operating

or controlling machinery, monotony of work, necessary concentration, etc. To these must be added the ill effects arising from irregular or improper or unsuitable foods and drinks and insanitary environment, and these are, naturally, increased by conditions of (*a*) overtime, (*b*) overstrain, (*c*) over-fatigue.

2. This second group includes the mechanical dangers from high explosives and the very large number of different diseases due to absorption of toxic substances by the workers, the symptoms varying according to the poison or toxin. Thus, there are the well-known poisonings from working in lead, brass (compound of zinc and copper), phosphorus, bronze (alloy of copper and tin and aluminium or other metals), chromium, cyanides, copper, arsenic, antimony, mercury, zinc, vanadium, platinum, etc. These, however, are not what may be described as *war* occupational diseases in the real sense, except in so far as woman labour has supplemented, if not taken the place of, man labour, with the result, as is often the case, that women workers, being new to the work, are suffering in greater proportion than the men, who were more or less *immune* from use. The real *war* occupational diseases may be tabulated as follows :—

a. Nitrobenzol and dinitrobenzol, produced by the action upon benzol of nitric and sulphuric acids, and employed in the manufacture of high explosives and aniline. The substances are very poisonous. The symptoms of nitrobenzol poisoning are nausea and vomiting, throbbing in the head, dizziness and tinnitus aurium, respiratory embarrassment with cyanosis of face and lips (extending to the whole body at times), lessened blood-pressure, anæmia, weakness, coma and death—the blood being decomposed, red cells deformed, and hæmatin set free in the blood-stream. The symptoms of dinitrobenzol poisoning are loss of appetite and diarrhœa, enlargement of the liver, headache and vertigo, with yellow staining of mucous membranes of the tongue, mouth, and pharynx, and of the urine, accompanied by restricted vision, anæmia of papilla, venous engorgement of retinal vessels, amblyopia, etc.

b. 'T.N.T.,' or trinitrotoluene or trotyl, produced by nitrating toluene (a product of coal-tar distillation), forming thereby a high explosive. The special symptoms of T.N.T. poisoning were set out in full in the MEDICAL ANNUAL, 1917, pp. 580-1. Young people are specially susceptible. Jaundice is a serious symptom, pointing to cell-degeneration (liver cells), and death results in three to four weeks after the appearance of jaundice in a fatal case. The kidneys may be similarly affected.

c. 'Dope' of tetrachlorethane, used in waterproofing the wings of aeroplanes, etc. It is a cellulose varnish (a solution of acetate of cellulose in a mixture of benzene, acetone, methylated spirits, and tetrachlorethane). The symptoms were fully set out in the MEDICAL ANNUAL, 1916, p. 712. Fortunately, the use of tetrachlorethane has been discontinued. Tetrachlorethane acts upon the liver and kidneys in the same way as trinitrotoluene, causing cell-disintegration or cell-degeneration.

d. Methyl alcohol (wood spirit), used as a solvent for shellac and gums in the making of varnish, etc. The symptoms are nausea and vomiting, abdominal pains, vertigo and headache, lassitude and prostration, restlessness and insomnia, dilatation and immobility of the pupils, etc.

e. C.E. (tetryl or tetranitromethylanilin) and lyddite (picric acid and trinitrophenol), used in making high explosives. The symptoms resemble those from T.N.T. (trinitrotoluene) poisoning with staining of exposed skin and setting up of dermatitis—C.E. affecting chiefly the conjunctivæ, alæ nasi, neck and chin, and lyddite the hands and forearms. Constitutional symptoms are slight—no toxic jaundice, but gastritis and breathlessness have been noticed with C.E. poisoning.

In any article dealing with occupational war diseases, reference must be made to the work of the Health of Munition Workers Committee under the chairmanship of Sir George Newman, M.D. This Committee was appointed by the Ministry of Munitions, with the consent of the Home Office, and has to deal with many and important subjects, which may be grouped as follows: (1) The aims and work of the Committee; (2) Laws of Health for workers: (3) Labour problems of health; (4) Food and canteens; (5) Fresh air and ventilation; (6) The employment of women; (7) The employment of juveniles; and (8) Industrial efficiency and fatigue.

Welfare work amongst both male and female employees is a *sine qua non*, such welfare work being under properly qualified female supervision in the case of female workers. America admitted this necessity before the War; Britain is only admitting it now by degrees, after three years of war! The object is the well-being of the worker, good and cheap food for consumption, suitable amount of rest and intermittent recreation, with the lessening, by every means available, of the monotony and irksomeness of the particular work upon which the worker is employed. Not only is the workers' health improved, but there is, concurrently, increased production. An important branch of this welfare work in the case of female employees is the day nursery or crèche, provided for babies of munition (and other) workers, and situated in close vicinity to the work-place or factory, so that the babies can be well looked after and naturally nursed by their mothers, who, for that purpose, are allowed 'time off' from work without deduction of pay.

There is an intimate inter-relationship between hours of labour and working efficiency. The latest statistics cannot be gainsaid. Women engaged in turning aluminium fuse-boxes, whose hourly output at sixty-six hours a week was an average of 100, gave an output of 134 and 138 respectively when the weekly hours worked were reduced to 54·8 and 45·6. Men engaged in heavy work, with an hourly average of 100 for a fifty-eight hours week, increased this average to 139 when the working hours were reduced to a fifty-one-hours week. Boys on light work, giving an output of an hourly average of 100 for a seventy-two-hours week, increased such output to 117 and 129 for a fifty-four-hours and fifty-three-hours week respectively. These statistics are the result of precise investigations.

Drinking Water in Factories and Workshops.

On Dec. 1, 1917, an Order came into force, making compulsory the supply of wholesome drinking water at points conveniently accessible at all times to all persons employed, in all factories and workshops (in which twenty-five or more persons are employed). The water-supply must be from a public main or from some other source of supply, approved in writing by the local authority of the

district, and at least one suitable cup or drinking vessel must be provided at each point of supply, with facilities for rinsing it in drinking-water, except where the water is delivered in an upward jet from which the workers can conveniently drink. The water must be either laid on, or contained in a suitable vessel.

The Order is dated Oct. 9, 1917, and was issued by the Home Office under the signature of the Home Secretary under power conferred under Section 7 (1) of the Police, Factories, etc. (Miscellaneous Provisions) Act, 1916.

The upward fountain jet is an American idea originally, and the water is delivered (*a*) continuously, or (*b*) intermittently—the latter being operated by the consumer. In practice it is advised that the jet should be continuous and the water discharged at an angle from a nozzle that is protected in such a way as to prevent a consumer putting his or her mouth to the actual opening. The fountain jet is much better than the cup or drinking-vessel arrangement.

IV. SCHOOL MEDICAL SERVICE.

Results of School Medical Inspection.

The statistics recently published by the London County Council are interesting. During 1916, 256,847 children were examined, and of these, 88,415 were found to require medical treatment for one or more defects, i.e., 34·4 per cent. As compared with previous years, more children were treated during 1916—a satisfactory statement to be able to make, when it is remembered that inspection without subsequent treatment is useless. Other districts show similar and equally satisfactory results, the outcome of a small section of a small Act, viz., the Education (Administrative Provisions) Act, 1907, Section 13, supplemented since by small Acts dealing with powers for treatment, feeding, etc.

Dental Clinics and School Medical Inspection.

Speaking generally for the country as a whole, dental disease heads the list of defects found on school medical inspection. *Oral sepsis*, as it is called, directly or indirectly causes many different types of illness amongst school children (and others), calling for serious attention by those responsible. Formerly it was *mens sana in corpore sano*. Now we may alter the quotation to *corpus sanum in ore sano*. A healthy body depends upon a healthy mouth in the same way as a healthy mind depends upon a healthy body. Not only diseases, but deformities, of the mouth require attention. Conservative dentistry is wanted—not wholesale extractions—so as to secure the prevention of chronic gingivitis and pyorrhœa alveolaris, with consequent improved mastication and digestion and absence of caries. Clear the mouths (and keep them cleared) of dental staphylococci, streptococci, and pneumococci, and the standard of general bodily health will be raised. Temporary as well as permanent teeth require attention. Premature and delayed extractions are equally bad. Common dental maladies must be recognized by the school medical inspectors, e.g., alveolar abscesses, pyorrhœa alveolaris, caries, dental

fistulæ, oral sepsis (incipient and advanced), maxillary deformities, etc., and the patients must then be sent to the school dentists at the 'dental clinics.' School medical inspectors should not be tempted to *treat* dental cases. Dental clinics for school children should be much more in use than they are at present—half cost being claimable from the Board of Education.

As showing the importance of dentistry, the Lord President of the Council has appointed a Departmental Committee, under the chairmanship of the Rt. Hon. Francis Acland, M.P., to investigate the extent and gravity of the evils connected with the practice of dentistry and dental surgery by persons not qualified under the Dentists Act, and to consider and report upon (1) The causes of the present inadequate supply of qualified dentists and dental surgeons ; (2) The expediency of legislation, prohibiting in the United Kingdom the practice of dentistry and dental surgery by unqualified persons ; and, in the event of such legislation being deemed expedient, the conditions under which certain classes of unqualified persons at present engaged in the practice of dentistry might be permitted to continue to practise, by the institution of a special roll for the purpose ; (3) The practicability, without impairing the existing guarantees for the efficient practice of dentistry, of (*a*) modifying the course of study and examination prescribed for dental qualifications, (*b*) reducing the time occupied in qualifying, (*c*) diminishing the cost of training dental students.

The Committee requires documentary evidence of the extent of the adequacy of the supply of qualified dentists and dental surgeons, and the extent and gravity of the evils connected with the practice of dentistry and dental surgery by persons not qualified under the Dentists Act. The importance of the matter in regard to the health of the community goes without saying.

THE EDITOR'S TABLE.

Samples (not returnable) and particulars for this section should be sent to The Editor, "Medical Annual" Offices, Stonebridge, Bristol, on or before November 15.

We are anxious to express no opinion except as a result of practical knowledge, and it is owing to this fact that a notice in the MEDICAL ANNUAL *has come to be valued.*

NEW PHARMACEUTICAL PRODUCTS AND DIETETIC ARTICLES.

We are always ready, when a sufficient quantity is sent to us EARLY IN THE YEAR, *to arrange for these to be tested in hospital practice and reported upon; under other circumstances our knowledge is necessarily more limited; but frequently the simple information as to where a particular preparation can be obtained is all the practitioner requires.*

NEW MEDICAL INSTRUMENTS AND APPLIANCES.

We give Inventors and Manufacturers the opportunity of bringing their work before our readers entirely free of cost to themselves, subject only to the following conditions:—

(1) Each article sent for notice must have the novelty or improvement claimed for it clearly stated upon a SEPARATE *sheet or sheets of paper. This should have attached to it any illustration* (WHICH MUST BE SMALL) *for which insertion is desired, and also bear the maker's name. The attention of firms who send a large number of articles for notice is particularly directed to the above condition, as each article has to be sorted into its proper department before it can be considered.*

(2) Medical Inventors should merely describe the instrument or appliance, and avoid giving technique of operations.

The Editor is not able to accept reference to circulars, catalogues, or literature as a compliance with these conditions.

PROGRESS OF PHARMACY, DIETETICS, ETC.

Alkagen Lozenges, consisting of the same combination of magnesium hydroxide with peppermint oil as that on which we have already made favourable comment when issued in the form of tablets, are now made by Messrs. Allen & Hanburys, London. They constitute a very useful form of antacid, and are rightly described by the manufacturers as much superior to soda-mint and similar combinations.

Apyrogen.—Our readers may like to be reminded of this readily used form of distilled water, sent out by Messrs. Allen & Hanburys in a special capsule, ready for intravenous injection, and guaranteed sterile and free from water-toxin. Normal saline, glucose, Ringer's, and hypertonic saline solutions are also supplied with 'apyrogen' distilled water used as a base. Moreover, salvarsan and neosalvarsan solutions can be supplied ready prepared, by notice being given to the firm.

Aseptoid Products are moulded (not compressed) cubes, which rapidly dissolve in water. An example is the nasal formula of which a sample has been sent to us. These cubes, which are sold at 2/6 per gross, each contain sodium chloride gr. 7, sodium biborate gr. $2\frac{1}{2}$, menthol gr. $\frac{1}{50}$, thymol gr. $\frac{1}{100}$, cocaine hydrochloride gr. $\frac{1}{6}$, oil of wintergreen min. $\frac{1}{20}$, with boric acid and benzoate of soda. We find that a cube dissolves in 2 oz. of cold water in less than two minutes, and forms a pleasant nasal lotion. Messrs. Oppenheimer, Sons & Co. Ltd., Queen Victoria St., London, who are the manufacturers, sell an efficient nasal douche at 8d., also a simple spray apparatus at 3/-.

Bacterol.—This germicide is issued by Messrs. Menley & James, Farringdon Road, E.C., who describe it as "a preparation based upon infusions of eucalyptus and Alpine peppermint, combined with formaldehyde and iodine, and prepared and modified by special processes at a high temperature." It is said to be stable, non-toxic, non-caustic, and non-irritating, producing clear solutions in water. It is issued in five different types—

medical, general, vaporizing, aeriform, and veterinary. It is designed for use as a surgical antiseptic, as a disinfectant and deodorizer, and as an antiseptic for inhalation into the nasal passages. There is, it appears, experimental evidence in support of the claims put forward on its behalf by the manufacturers, but obviously only an extended trial—which it appears to deserve—can decide its clinical value. The suggested indications for its use are infective lesions of the skin, mouth, and upper respiratory tract, as well as all surgical procedures in which efficient sterilization is necessary. A portable apparatus is sold by the makers for its employment as a disinfectant in the form of vapour.

"Bipp" (B.I.P.P.).—This word has already established itself in the professional vocabulary. As is well known, it is a bismuth-iodoform-paraffin-paste introduced by Mr. Rutherford Morison, of Newcastle, for the treatment of purulent wounds and wound cavities. Along the lines of communication in France and elsewhere, the verb 'to bipp' is already so familiar that nothing need be said here as to the value of this plan of treatment. The profession at home, however, may be glad to learn that Messrs. Oppenheimer are selling the paste in collapsible tubes of convenient size. We trust that it may find the application which it deserves in civil practice.

Bordet Bacillus Vaccine, prepared in the vaccine laboratory of St. Mary's Hospital, London, founded by Sir Almroth Wright, is supplied to the profession through Parke, Davis & Co. Each c.c. contains 250 million killed bacilli. There is increasing evidence to show that inoculation with this vaccine is a valuable means of cutting short an attack of whooping-cough. Recent opinion is in favour of giving larger doses than heretofore has been customary; for example, the New York Board of Health suggest that children under one year should be given an initial dose of 250 million, with subsequent injections of 500, 1000, 1500, and 2000 million at intervals of two or three days, and that older children should have doses of 500, 1000, 2000, and 3000 million at similar intervals, the last dose to be repeated whilst necessary. The vaccine is supplied in ampoules of 1 c.c., also in vials of 10 or 25 c.c.

Bynogen, which we noticed in a previous issue as a reliable casein-phosphorus tonic, is now put up in a convenient and palatable tablet by the makers, Messrs. Allen & Hanburys. Each tablet costs approximately one halfpenny, and the daily dose for an adult is from six upwards.

Capsotherm is a carefully-padded absorbent wool, saturated with capsicum and possessing an impermeable back. This latter property greatly increases its value as a counter-irritant, the purpose for which it is of course designed. It is made and sold by Messrs. Oppenheimer, Sons & Co. Ltd., and full directions are supplied with each box.

Colloidal Copper.—Readers of the MEDICAL ANNUAL will be familiar with the pharmacological and therapeutic claims of the colloidal metals. Messrs. Oppenheimer have put a standard colloidal solution of copper on the market, in aseptules, for hypodermic injection.

"Colman's Mustard" is almost as familiar a name to English ears as that of the Tower of London. It is a national institution, and needs no commendation, but we are glad to remind our readers, from samples received, that this firm prepares also *mustard oil* for external use and *mustard bran* for making mustard baths. Their London address is 108, Cannon Street.

Diphtheria Prophylactic, a mixture of diphtheria toxin and antitoxin, affords a valuable prophylactic treatment for those who are likely to come into contact with the disease. It confers more enduring immunity than does a prophylactic dose of antidiphtheritic serum; but as its immunizing effect is more gradually produced it does not take the place of the serum when an individual has already been exposed to infection, though in such a case its use in addition confers a more lasting protection than does the

serum alone. The preparation is supplied in sets of three bulbs, the number required for one individual, whether child or adult. Messrs. Parke, Davis & Co., London, W.

Dormigene, issued in 5-gr. tablets, is a hypnotic of the veronal group, being brom-isovaleryl-urea. It is said to possess a low toxicity. Manufacturers, Messrs. Allen and Hanburys.

Hordine is Messrs. Oppenheimer's preparation of liquid barley malt. It is put up in combination with Easton's syrup, with glycerophosphates, and with Parrish's food, as well as in the plain form.

Jardox, a new recruit to the large army of meat extracts, is made from beef, and analysis seems to justify its claim to a high content of meat derivatives. It has a pleasant flavour; the manufacturers compare it to that of home-made beef-tea, but for ourselves we prefer the 'jardox' to any home-made beef-tea we have encountered so far. It is sold in a neat jar at a reasonable price. The name is a positive inspiration. The idea which it expresses is as neatly concentrated as the substance whose name it furnishes. Manufactured by Jardox Ltd., Anerley, S.E.

Liq. Gastrorabe (Oppenheimer) is an *acid* preparation, containing bismuth, pepsin, nux vomica, and hydrocyanic acid. Its claims to notice lie in its stability and its pleasant appearance and taste.

Liquid Pancreatin, a reliable preparation of the digestive ferments of the pancreatic secretion, is prescribed in doses of 1 to 2 fluid drachms in cases of intestinal indigestion. It is also much employed to predigest foods for invalids; 2 fluid drachms, with 20 gr. of sodium bicarbonate, will peptonize 16 oz. of milk in from thirty to sixty minutes. The preparation is supplied in bottles of 4, 8, and 16 fluid ounces.

Luetin, a suspension of comminuted killed cultures of the *Treponema pallidum*, provides a valuable means of diagnosing the disease in latent, tertiary, and parasyphilitic stages; also in congenital and visceral syphilis; it cannot, however, be relied upon in primary, and not always in secondary, cases. The test can be carried out by any physician; it merely requires the intradermal injection of the luetin by means of a hypodermic syringe; this is followed in syphilitic subjects by a local inflammatory reaction, but in non-luetic individuals no effect beyond a slight erythema is produced. Luetin (Parke, Davis & Co.) is carefully tested, bacteriologically and physiologically, before it is sent out, to ensure its freedom from living organisms and that it is of correct potency. It is supplied in bulbs, each containing sufficient for one test, with full directions.

Medicated Soap.—The frequency of irritable eruptions and scabies at the Front has created a great demand for a soap made by Chas. Midgley, Ltd., 4, Exchange Street, Manchester. It contains sulph. præcip. 5 per cent, camphor 5 per cent, and bals. peru. 3 per cent. This not only gives relief to the irritation, but has a curative effect.

The same firm also produces a soap powder in a bag. This is dipped in the hot water of the bath so as to impregnate the water, and then rubbed gently over the skin. It has a very soothing effect and relieves irritation. We hear that it is very popular at the Front.

Pituitary Gland (Anterior Lobe) is sold by Messrs. Allen & Hanburys in 'kapsols,' i.e. gelatin capsules; this is a form very convenient for oral administration.

Protosil Ointment contains 5 per cent of protosil—a colloidal silver preparation which possesses germicidal power with some astringent action, and is non-irritating to mucous membrane. This ointment proves useful in many inflammatory conditions of the mucous membranes. It is supplied in convenient collapsible tubes. Parke, Davis & Co., London.

Pulverettes are powders, each of which is enclosed within a frail chocolate or sugar coating like an eggshell. This coating dissolves rapidly in the stomach, liberating the contents and ensuring efficient and thorough absorption. The advantages of this method over the usual pill or tablet preparation, which may pass unchanged through the whole alimentary tract, are obvious, if the manufacturers' claims are substantiated. We have tested several pulverettes, and find that the coating cracks under moderate pressure between two hard substances. It dissolves away in cold water in five or ten minutes. We cannot quite agree with the advertisement which states that slight pressure between thumb and finger will crack the coating and liberate the powder. It is so with some we have tested, but not with all. Over fifty formulæ are prepared in this way, and the prices at which they are sold appear to be reasonable. Messrs. Oppenheimer are the makers.

Renaglandin, a concentrated solution of the active principles of the suprarenal gland, is now put up by Messrs. Oppenheimer in the form of 'rectones,' or readily soluble suppositories, for use in the treatment of hæmorrhoids, to check bleeding and reduce swelling.

Robinson's Patent Barley and **Patent Groats** are still sold in the familiar tins. Careful directions for preparation are printed on the tins. Address, Keen, Robinson & Co., London.

Roboleine is an excellent preparation, put up by Messrs. Oppenheimer. It consists of extract of malt, bone-marrow, extract of yeast, and hypophosphites. The yeast was added, the manufacturers tell us, because of its rich vitamine content. The value of this preparation to the marasmic or debilitated child is too obvious to call for discussion. It is pleasantly prepared and inexpensively packed.

Seawater Plasma, the applications of which in clinical medicine are familiar to readers of the ANNUAL, is now sold by Messrs. Oppenheimer in 'aseptules' for subcutaneous injection, also in bottles for internal or local administration. For injection, the necessary syringe is also sold by the same firm.

Sotol.—Under this name the Western Dental Manufacturing Co., 74, Wigmore St., W., have issued very attractive tablets for making an effervescent solution to use as a mouth-wash, gargle, or nasal lotion. Its taste is pleasant. One tablet suffices for 4 oz. of solution. An efficient atomizer for its application to the nose is sold at 5/–. The tablets themselves are sold in bottles ranging from 1/6 per bottle of 40 to 9/6 per bottle of 500.

Sphagnol.—This is a valuable addition to the series of tars already available for use in local treatment. It consists of the tar distilled from peat. The manufacturers, Peat Products Ltd., 18, Queenhithe, E.C., have forwarded us specimens of sphagnol ointment, and shaving, medical, and toilet soaps. The smell is not unpleasant, and the soaps are of excellent quality. The ointment should be of considerable value in the treatment of pruritus ani and other irritable skin conditions. A sphagnol suppository is also made.

Tetraglandular Tablets containing the dried suprarenal, pituitary, thyroid, and parathyroid glands have been prepared in response to a demand for such a combination. They are employed in various conditions thought to depend upon disturbance of the glandular system, and are supplied in bottles of 25 or 50 tablets. Parke, Davis & Co., London.

Thymotussin.—There is apparently a considerable body of opinion which regards common thyme as little short of specific in the treatment of whooping cough. It is in accordance with this opinion that Messrs. Oppenheimer have sought to provide a British-made product. Thymotussin is prepared from fresh green thyme in combination with honey, aromatics, and chloroform. It is an elegant and palatable preparation, and is said to be free from all toxic effects.

MEDICAL AND SURGICAL APPLIANCES.

Ambulance Case.—This is intended for use in factories or in any place where first aid may be required for wounds or injuries. A metal case, 14 inches by 5 inches, is arranged to hang against a wall. The front lets down and forms a tray which is useful when a dressing is in progress. There are shelves and divisions containing aseptic dressings for the fingers, the foot and hand, and larger dressings for wounds of the limbs and head. (*Fig.* 120.) They are maintained aseptic by a wrapping of sterilized wool as well as the impermeable wrapping. There is also a roll of lint and cotton-wool (aseptic). Eye injuries are provided for by a solution of cocaine (0·5 per cent), and hyd. perchlor. (1–3000)

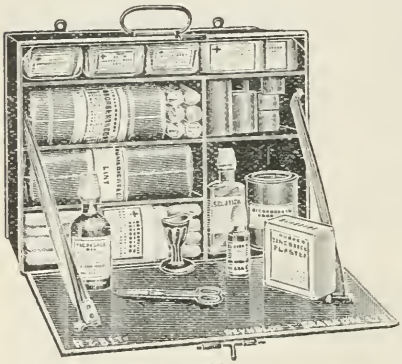

Fig. 120.

in castor oil; burns and scalds by a plentiful supply of bicarbonate of soda. There are also a number of ampoules of iodine, a roll of zinc plaster, and an assortment of bandages.

The whole arrangement is eminently practical, with a plentiful supply of the articles most often required. This is only what we should expect from anything designed by the firm of Reynolds and Branson, of Leeds. Every detail is always well thought out. Apart from its contents, we think the case is just the thing for the hospital-ward and the surgery, to contain the small things required for minor surgery and dressings. The case, complete with dressings, etc., costs £1 16s.

Bandage Winder (the Elkington).—This is one of the most efficient bandage winders that have come under our notice. It easily adapts itself to any width of material, and gives a close, firmly-rolled bandage. It should prove valuable in all hospitals, and is a very satisfactory appliance. It is manufactured by Thos. J. Dyer & Co., 45, Wilson Street, Finsbury Square, E.C.2.

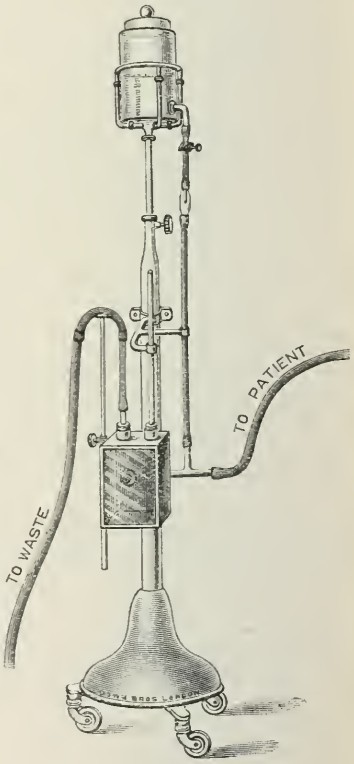

Fig. 121.

Bladder Irrigator (Automatic).—This apparatus (*Fig.* 121) has been devised by Mr. Laver to flush out the bladder automatically, and at more or less regular intervals, and has been found most useful in a number of trials.

Into one side of a receiving chamber is fixed one horizontal arm of an

inverted T tube. The vertical arm of the tube is connected with a reservoir of irrigating fluid placed above the receiving chamber, and the other horizontal arm is attached by rubber tubing to a catheter tied in the patient's bladder. In the top of the receiving chamber is fitted a vertical glass tube (known as the 'tower'), and the short arm of a rubber siphon-tube running over a simple raise-and-lower arrangement. The receiving chamber is arranged at least one foot below the level of the patient's bladder, and the bend of the siphon tube somewhat above the bladder level.

When the irrigator is in action the fluid flows from the reservoir down the vertical arm of the T tube, filling both receiving chamber and a portion of catheter tube to the same level. As this continues, the fluid rises in the siphon tube, tower, and catheter tube, till the bladder level is reached. Owing to the muscular tone of the bladder there must be a certain head of pressure in the tower before fluid will flow in. As the bladder relaxes, admitting fluid, the level in the siphon tube and tower rises, and when the level of the siphon tube is reached, the siphon will act, discharging fluid from the receiving chamber when that in the tower will fall below the level of that in the bladder. At this point the bladder will drain into the receiving chamber until empty. The level in the receiving chamber will then fall below that in the short arm of the siphon; air enters through the tower, and the siphon action naturally ceases. The cycle is then repeated. A screw clamp regulates the rate of flow, so that lavage can be practised at any reasonable interval of time desired.

Messrs. Down Bros., Ltd., St. Thomas' Street, S.E.1, are the manufacturers.

Blood-transfusion Apparatus.—This apparatus has been brought to the notice of the profession by Col. Fullerton, Major Georges Dreyer, and Capt. H. C. Bazett. The cannulæ are of silver, and have bulbed extremities,

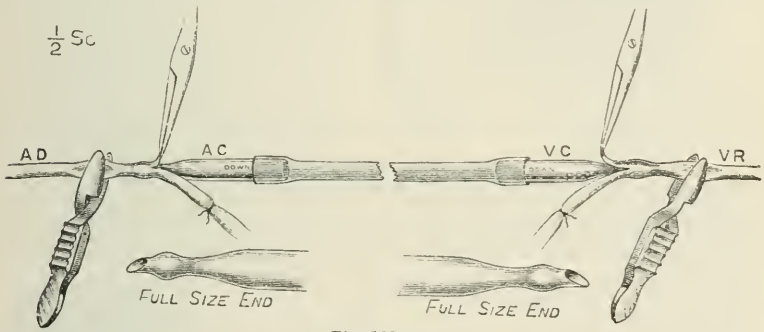

Fig. 122.

which obviate the trouble of tying in; they are shown *in situ* (*Fig.* 122): AC, the larger or arterial cannula, is resting in the artery of the donor (AD), and the smaller venous cannula (VC) in the vein of the recipient (VR). The two cannulæ are united by transparent indiarubber tubing which admits of observation of the passage of the blood and facilitates the detection of clotting, etc. Two light spring vessel clips are provided to control the flow. Before use the whole apparatus is coated within and without with a layer of hard and soft paraffin wax, mixed in such proportions as to set at a temperature of about 45° C. This mixture may be used again and again, but should be strained occasionally to ensure its freedom from solid particles. The rubber tubing can be used several times, if necessary, but it is preferable to renew it for each operation. The coating is effected by immersing the apparatus in the paraffin mixture in a bath, the temperature of the mixture being kept at about 130° C. Sterilization of the cannulæ and tubes is thus effected. If the tubes and cannulæ are

coated in this way, no clotting need be anticipated. Should clotting take place, it will be found to be due to excessive injury to the vessels, especially the artery, or to damage to the coating of the tubes from rough handling. All that is necessary in that event is to replace the apparatus with another, which should always be at hand. The cannulæ and accessories are made by Down Bros. Ltd., St. Thomas's Street, London, S.E.1.

Blood Transfusion, Tubes for.—The method of blood transfusion by the Kimpton-Brown tube was described in the MEDICAL ANNUAL, 1917, pp. 113, 114. A vein at the elbow of the donor and one in the arm of the recipient are exposed. A ligature is placed on the donor's vein and tightened proximally, and the vein opened longitudinally. The incision edges being held apart, the cannula of the Kimpton tube, directed to the periphery, is inserted into the lumen of the vein. The donor is then directed to open and close his hand slowly, and the pumping effect thus brought about will fill a large tube in two or three minutes. The tube is withdrawn and turned on its side with the cannula end pointing upward; in this position no blood can escape. The donor's vein is clamped temporarily (for further use), or else left to an assistant for closure.

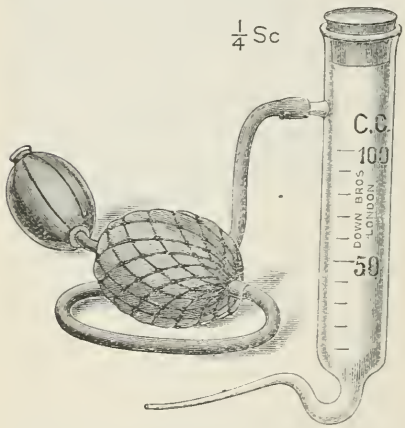

Fig. 123.

The recipient's vein is treated as that of the donor, except that it is ligated distally, and the cannula of the tube is directed into it centrally. By means of the bellows (attached as in *Fig.* 123), very slight pressure is exerted, and the blood flows into the recipient at a rate which is thus under control. If more blood is required, the operation should be repeated with a fresh tube. The operation is terminated by closing the small wounds made in exposing the veins.

The safety and success of the operation depend on proper preparation of the tube, directions for which are issued with the instrument. The advantage claimed is that donor and recipient do not have to be brought in contact, or in the same room with each other, as in the direct and anastomosis methods.

The tubes, etc., are supplied by Down Bros. Ltd.

Hæmacytometer (The 'Thoma'), — This is manufactured by Messrs. Hawksley & Sons, 357, Oxford Street, W., and differs from instruments of foreign manufacturers in the fact that the counting-chamber is made from a solid piece of glass instead of a cemented circle or square which may become detached during the necessary cleanings which the use of the instrument requires. The counting-squares are divided into 16 blocks of 16 squares each by means of double rulings. The individual squares are $\frac{1}{400}$ sq. mm. The slide is enclosed in a case, which also contains two mixing pipettes for red and white corpuscles respectively.

The makers publish a useful pamphlet giving directions as to the best method of counting the corpuscles. The name of the firm is a sufficient guarantee of the accuracy and care with which the instrument is produced.

Inhaler (Improved Junker's).—This inhaler (*Fig.* 124) will appeal to those who use Junker's chloroform inhaler in darkened rooms for laryngological operations, etc., as it effectually prevents any accident arising from the bellows being inadvertently attached to the outlet instead of the inlet tube.

The illustration shows the details of the simple ball valve, which cannot get out of order, and locks at the slightest reverse pressure. The top of the valve is a sieve which breaks up the air-stream into a spray, which is deflected

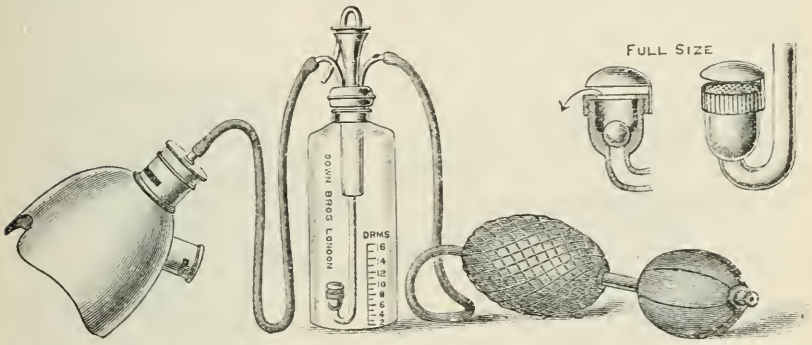

Fig. 124.

downward by a hood, thus preventing the chloroform from splashing into the exit tube. It has been made by Messrs. Down Bros. at the suggestion of Mr. Morris Rigby.

Pregnancy Belt.—We have frequently called attention to the abdominal supports produced by the Domen Company. We have had many years' clinical experience of their use, in a large number of cases, and they do their work perfectly. *Fig.* 125 shows a belt designed to carry and support the abdomen during pregnancy. The front is elastic, and therefore prevents undue pressure. The size of the abdomen, which naturally alters during pregnancy, is easily fitted by means of a broad adjustable band which supports the lower part of the abdomen. They are moderate in price, and much diminish the physical discomfort of the pregnant woman. Domen Belts Co., 456, Strand, W.C.2.

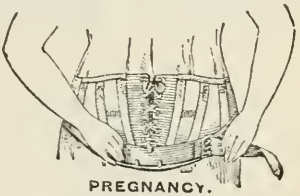

Fig. 125.

Sphygmomanometer (Pocket). — *Fig.* 126 illustrates an instrument for taking the blood-pressure which appears to us to have many advantages. It is both compact and accurate, and can be carried also without fear of spilling the mercury or getting out of gear. The construction of the apparatus will be readily understood from the illustration. It is made by the Holborn Surgical Instrument Co., 26, Thavies Inn, E.C.1.

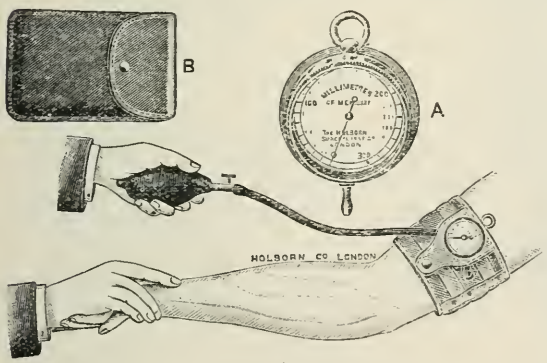

Fig. 126.

Stethoscope (Differential). — Dr. Leyton, of the London Hospital, has designed a stethoscope (*Fig.* 127) which claims to eliminate the errors of the Boek instrument. A range of relative sound values is marked upon the dial, which is said to be mathematically correct. The use of the differential

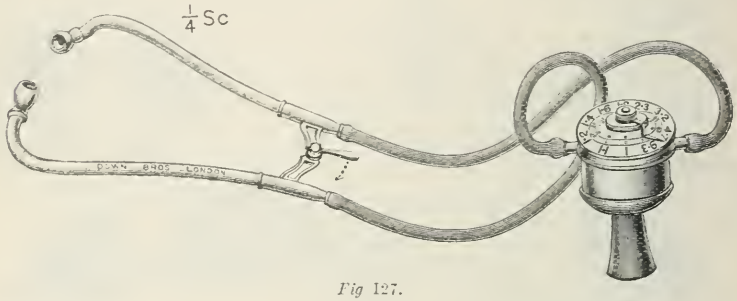

Fig 127.

stethoscope is based on the law that the normal ratio of the intensities of the first apical to the second aortic sound has been found to be as 2 is to 1; any deviation from this ratio indicates myocardial degeneration. Personally we should require other physical signs before we reached this conclusion. Messrs. Down Bros., Ltd., St. Thomas St., S.E.1, are the manufacturers.

Traction Apparatus (The Echois).—This is practically a necessary appliance in hospitals where fractures and open operations upon the long bones are treated by plaster-of-Paris casts. It has proved of incalculable value in the treatment of tuberculosis of the hip, and in ambulatory treatment of fracture of the thigh. It is also very useful in applying bone-plates. The nature of the apparatus will be gathered from the

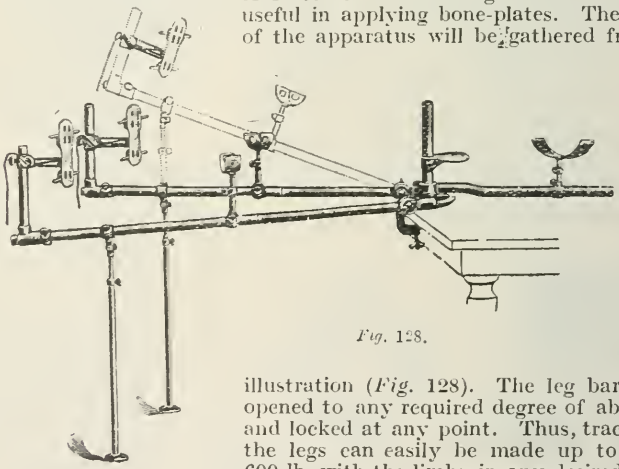

Fig. 128.

illustration (*Fig.* 128). The leg bar can be opened to any required degree of abduction and locked at any point. Thus, traction on the legs can easily be made up to 500 or 600 lb. with the limbs in any desired degree of abduction. The makers have improved on the original apparatus by jointing the extension bars so that either limb may be elevated or lowered. There is also a back-rest adjustable in height as well as in length. It is made by E. H. Karrer & Co., 278, West Water Street, Milwaukee, Wis., U.S.A.

Tourniquet.—This is designed by Mr. Joseph E. Adams, of St. Thomas's Hospital. The tourniquet is fastened by a metal plate with wide base and

two circular openings, one complete, and the other slotted to admit the rubber tubing that supplies the compression (*Fig.* 129). It is applied as follows: The left forefinger is hooked through the complete ring, the plate being held on the upper aspect of the limb, while the first turn is made round and

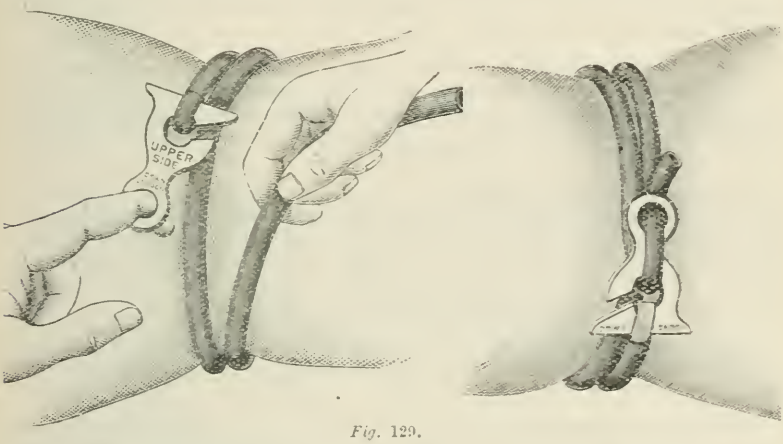

Fig. 129.

under the limb and beneath the metal plate. The base of this is then pressed down on the rubber to secure it, while the right hand makes the second turn with sufficient pressure to obliterate the arterial circulation. The tubing is then stretched to flatten it, so that it will go into the slot in the proximal opening of the plate, which is of such a size as to prevent its escape. The end of the tube is then threaded through the complete ring to guard against any further slipping. Two turns of the rubber tubing suffice for the lower limb, and one turn for the arm. The skin is of course protected as usual with a fold of lint or other soft material. Messrs. Down Bros., Ltd., St. Thomas's Street, London, S.E.1, are the manufacturers.

Fig. 130.

X-ray Protective Clothing. — Messrs. Rothband & Co., Bent Street, Manchester, N., have produced a pliable material which is impervious to *x* rays. It can be made into coats, aprons, gloves, screens, etc., and is quite sterilizable. This invention will be a boon to all workers in the *x*-ray department. (*Fig.* 130.)

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If it is good and rapid, it saves the tubes from the heavy load they must bear when an inferior photographic plate is used. It would be difficult to find any so satisfactory as the Barnet *x*-ray plate made by Messrs. Elliott & Sons, of Barnet. They have recently published a pamphlet containing a number of photographs, which are interesting in themselves, and also prove beyond question the excellence of the plates produced by this firm. Our readers would do well to obtain a copy.

X-ray Tube Stand.— This is an ideal tube stand for all *x*-ray work. It has conveniences for every possible movement, whether vertical, horizontal, rotary, or tilting. The tube is enclosed in a wooden box, and affords protection to both operator and patient. It is made by Messrs. Harry W. Cox & Co. Ltd., 159, Great Portland Street, W.1.

X-ray Vertical Screening Stand. — The above firm have also designed a new vertical screening stand which has many advantages. The operator is enabled to make a fluoroscopic examination, and immediately afterwards a radiograph while the patient is in the standing position. The apparatus is arranged so that the operator is entirely protected from the action of the rays. Every detail for convenience and efficiency is well worked out. It can be used for the single photograph or stereoscopic work. It is an expensive piece of apparatus, but it contains so many practical features, and has such perfect adjustments, that it will be invaluable to those who have a large number of *x*-ray operations to carry out.

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The same firm supply some single-faced sheetings which possess similar properties. They are 36 inches wide, and cost 1/9 to 3/– a yard according to quality. We think they will prove useful in the surgical wards for many purposes.

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A List of the Principal Medical Works and New Editions Published during 1917.

**** *For the convenience of our readers any of the works in this list can be obtained from Messrs. John Wright and Sons, Ltd., "Medical Annual Offices," Bristol.*

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Army General Hospital Administration: Memoranda on. Edited by P. Mitchell. 8vo. *Baillière* - - - - - *Net* 5*s.*

Complete System of Nursing. By A. Millicent Ashdown. Demy 8vo, pp. 761. *J. M. Dent* - - - - - *Net* 10*s.* 6*d.*

Elementary Hygiene for Nurses. A Handbook for Nurses and Others. By H. E. Rutherford Darling. 13 Illus. Cr. 8vo, pp. 160. *Churchill* *Net* 3*s.*

Elements of Anatomy and Physiology for Nurses. By P. M. Dawson. Cr. 8vo. *Macmillan* - - - - - *Net* 7*s.* 6*d.*

'First Aid' to the Injured and Sick. By F. J. Warwick and A. C. Tunstall. An Advanced Ambulance Handbook. 10th revised ed. 18mo, pp. 260. *Wright & Sons* - - - - *Net* 1*s.* 6*d*

General Service Hints for V.A.D. Members. By Mrs. Thornton Cook. Revised by Miss Lilian Dennler. With a Preface by Mrs. Katherine Furze. 32mo, pp. 45. *Scientific Press* - - - - *Net* 1*s.* 3*d.*

Lectures on Medicine. A Handbook for Nurses. By Chalmers Watson. Cr. 8vo, pp. 303. *Livingstone* - - - - *Net* 4*s.* 6*d.*

Night Nurse, The. By J. Johnson Abraham. New and cheaper ed. Cr. 8vo, pp. 511. *Chapman & Hall* - - - - *Net* 1*s.*

Public Health Nursing. By M. S. Gardner. With an Introduction by M. A. Nutting. 2nd ed. Cr. 8vo. *Macmillan* – - *Net* 7*s.* 6*d.*

Surgical Nursing and After-treatment. By H. C. Rutherford Darling. A Handbook for Nurses and Others. Cr. 8vo. *Churchill* *Net* 8*s.* 6*d.*

Surgical Nursing and the Principles of Surgery for Nurses. By Russell Howard. 3rd ed. Cr. 8vo. *Edward Arnold* - 6*s.*

Text-Book for Nurses: Anatomy, Physiology, Surgery and Medicine. By E. W. Hey Groves and J. M. Fortescue-Brickdale. 2nd ed. Roy. 8vo, pp. 456. *Hodder & Stoughton* - - - *Net* 20*s.*

Text-book of War Nursing. By Violetta Thurstan. Cr. 8vo, pp. 227. *Putnam's* - - - - - - - *Net* 3*s.* 6*d.*

ANATOMY AND PHYSIOLOGY.

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Blood Pictures. An Introduction to Clinical Hæmatology. By Cecil Price-Jones. Demy 8vo, pp. 91. *Wright & Sons* - *Net* 6*s.* 6*d.*

Cunningham's Manual of Practical Anatomy. Revised and Edited by Arthur Robinson. 6th ed., revised. 3rd Impression. Vol. I. Cr. 8vo, pp. 703. *Hodder & Stoughton* - - - - *Net* 12*s.* 6*d.*

Essentials of Physiology. By F. A. Bainbridge and J. Acworth Menzies. 2nd ed. 8vo, pp. 478. *Longmans* - - - *Net* 12*s.* 6*d.*

Handbook of Physiology. By W. D. Halliburton. 13th ed. 8vo, pp. 349. *John Murray* - - - - - *Net* 16*s.*

Human Physiology. By Prof. Luigi Luciani. Translated by Frances A. Welby. In 5 vols. Vol. IV—The Sense Organs. Edited by Gordon M. Holmes, 8vo, pp. 536. *Macmillan* - - - *Net* 21*s.*

Introduction to the Physiology and Psychology of Sex. By S. Herbert. Demy 8vo, pp. 136. *Black* - - - - *Net* 3*s.* 6*d.*

Journal of Comparative Pathology and Therapeutics, The. Vol. XXX. Part 3—September, 1917. Edited by Sir John McFadyean and Sir S. Stockmar. 8vo. *Johnston* - - - - 2*s.* 6*d.*

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Glasgow District Hospital for Mental Diseases, Gartloch. Res. Med. Supt., W. A. Parker, M.B. Access—Garnkirk station, 1 mile.

Govan District Asylum, Hawkhead. Res. Med. Supt., Dr. J. H. MacDonald. Access — Crookston station.

Kirklands Asylum, Bothwell. Res. Med. Supt., Wm. M. Buchanan, M.B. Access—Bothwell and Fallside stations, ½ mile ; Glasgow, 9 miles.

Lanark District Asylum, Hartwood, Lanarkshire. Med. Supt., Dr. N. T. Kerr. Access—Hartwood station, ¼ mile.

Royal Asylum, Gartnavel. Res. Phys. Supt., Landel R. Oswald, M.B.

Smithston Asylum, Greenock. Res. Med. Off., Robert E. Kerr. Access—Greenock West, 1½ miles.

Gloucester.—*Barnwood House*. Res. Med. Supt., J. G. Soutar, M.B., C.M. Access—Gloucester, 2 miles. *See also p.* 802

Gloucester County Asylums, Wotton and Barnwood, Gloucester. Res. Med. Supt., Dr. J. Marnan. Access—Gloucester station, 1 mile.

Guernsey. — *St. Peter Port Asylum*, Med. Off., E. K. Corbin, M.R.C.S.

Haddington, N.B.—*East Lothian District Asylum*. 17 miles from Edinburgh. Supt., Miss Jean Sinclair. Med. Off., H. H. Robarts, M.D. Access—Haddington stat., 10 mins.

Hatton (near Warwick).—*County Asylum*. Res. Med. Supt., A. Miller, M.B. Access — Hatton G.W.R. station, 2 miles ; Warwick, 3 miles.

Haywards Heath. — *Brighton County Borough Asylum*. Res. Med. Supt., C. Planck, M.A., M.R.C.S. Access —Haywards Heath, 1½ miles.

Hellingly. — *East Sussex County Asylum*, nr. Eastbourne. Res. Med. Supt., F. R. P. Taylor, M.D., B.S. Access—Hellingly, 1 mile.

Henley-in-Arden (Warwickshire).— *Glendossill* and *Hurst Houses* (for both sexes). Res. Prop., Dr. S. H. Agar. Access — Henley-in-Arden, G.W.R., ¾ mile.

Hereford.—*County and City Asylum*, Med. Supt., T. C. Graves, M.B., F.R.C.S.E. Access—Barrs Court, G.W., Mid., and L. & N.W.R., Hereford, 3 miles.

Hitchin (Herts), near.—*Three Counties Asylum*. Res. Med. Supt., L. O. Fuller, M.R.C.S., L.R.C.P. Access—Three Counties stat., 1 mile.

Huddersfield (near).—*West Riding Asylum*, "*Storthes Hall*," Kirkburton. Res. Med. Supt., T. S. Adair, M.D. Access—Kirkburton, L. & N.W.R., 1 mile.

Hull.—*City Asylum*. Res. Med. Supt., J. Merson, M.D. Access—Willerby station, 1 mile; Hull, 6 miles.

Inverness.—*District Asylum*. Res. Med. Supt., T. C. Mackenzie, M.D. Access—Inverness, 2½ miles.

Ipswich.—*Borough Mental Hospital*. Res. Med. Supt., Dr. W. M. Ogilvie. Access—Ipswich, 2 miles.

Isle of Man.—*Lunatic Asylum*, Union Mills, Douglas. Res. Med. Supt., Arthur Finegan, L.R.C.P. & S., I. Access—Union Mills.

Isle of Wight.—*The County Asylum*, Whitecroft. Res. Med. Supt., W. J. A. Erskine, M.D. Access—Blackwater, ¾ mile; Newport, 2½ miles. *See also p.* 777

Isleworth (Middlesex).—*Wyke House*. Res. Prop., Dr. F. Murchison. Access—Isleworth, Brentford, and Osterley station, 1 mile.

Ivybridge.—*Plymouth Borough Asylum*. Res. Med. Supt., Dr. Wm. Starkey. Access—Bittaford, ¼ ml; Wrangaton, G.W.R., 1½ miles; Ivybridge, 3 mi es.

Jersey.—*Cranbourne Hall*, Grouville. Med. Supt., A. C. Stamberg, M.D. Access—Grouville, 2 mins. walk.

Jersey Asylum. Res. Med. Supt., Julius Labey, M.R.C.S. Access—Gorey Village, 1 mile.

Kilkenny.—*District Asylum*. Res. Med. Supt., Louis Buggy, L.R.C.P. Access—Kilkenny station, ¼ mile.

Killarney.—*District Asylum*. Res. Med. Supt., E. W. Griffin, M.D. Access—Killarney, ½ mile.

Knowle (near Fareham).—*County Asylum*. Med. Supt., H. K. Abbott, M.D. Access—Knowle platform, ⅛ mile.

Lancashire (near Newton-le-Willows).—*Haydock Lodge*, Private Mental Hospital. Res. Med. Prop., Dr. C. T. Street. Access—Newton-le-Willows, 2 miles. *See also p.* 791

Lancaster.—*County Asylum*. Res. Med. Supt., D. M. Cassidy, M.D. Also "*The Retreat*," for private patients. Access—Lancaster, L. & N.W. and Midland stations, each 1¼ miles. *See also p.* 796

Larbert (Stirlingshire).—*The Royal Scottish National Institution* (for education of imbecile children). Res. Med. Supt., Dr. R. D. Clarkson. Access—Larbert station, 1 mile.

Leeds (near Menston).—*West Riding Asylum*. Res. Med. Supt., S. Edgerley, M.D. Access—Guiseley, 1 mile.

Leek (Stafford).—*County Mental Hospital*, Cheddleton. Med. Supt., W. F. Menzies, M.D. Access—Wall Grange station, 1 mile.

Leicester.—*Mental Hospital*, Humberstone. Res. Med. Supt., J. F. Dixon, M.D. Access—Humberstone, ½ mile.

Leicestershire and Rutland Asylum. Res. Med. Supt., R. C. Stewart, M.R.C.S. Access—Narborough, ¾ mile; Leicester, 6 miles.

Letterkenny.—*Donegal District Asylum*. Res. Med. Supt., E. E. Moore, M.D. Access—Letterkenny and Lough Swilly Rly., 1 mile.

Lichfield.—*County Mental Hospital*, Burntwood, near Lichfield. Res. Med. Supt., J. B. Spence, M.D. Access—Lichfield City, 3½ miles; Trent Valley, 4½ miles; Hammerwich, 1½ miles.

Limerick.—*District Asylum*. Res. Med. Supt., Dr. P. J. Irwin. Access—Limerick station, ½ mile.

Lincoln.—*County Asylum*, Bracebridge. Res. Med. Supt., Dr. T. L. Johnston. Access—2½ miles from Lincoln G.N.R. station.

The Lawn, Lincoln. Res. Med. Supt., Arthur P. Russell, M.B. Access—Lincoln station, 1 mile. *See also p.* 805

Liverpool.—*Shaftesbury House*, Formby, near Liverpool and Southport. Res. Med. Supt., E. S. Hayes Gill, M.B. Access—Formby station, ¼ mile distant. *See also p.* 792

Tue Brook Villa, Liverpool, E. Res. Med. Supts., Drs. Tisdall & Ingall. Access—Tue Brook station or Green Lane car. *See also p.* 804

London. — *Bethlem Royal Hospital*, Lambeth Road, London, S.E. Physician Supt., J. G. Porter Phillips, M.D., M.R.C.P.
See also p. 794

Bethnall House, Cambridge Road, N.E. Res. Med. Supt., J. K. Will, M.D. Access—Cambridge Heath station.

Brooke House, Clapton, N.E Res. Med. Supt., Dr. Gerald Johnston. Access — Clapton, G.E.R.

Camberwell House, Peckham Road, S.E. Res. Med. Supt., F. H. Edwards, M.D., M.R.C.P. Asst. Med. Offs., H. J. Norman, M.B., B.Ch., D.P.H., R. Mansel-Jones, M.R.C.S., and R. H. Browne-Carthew, M.D. Tel., 'Psycholia, London.' Telephone, New Cross, 1057. *See also p.* 798

Chiswick House, Chiswick. Res. Lics., Dr. T. S. Tuke and C. M. Tuke, M.R.C.S. Access—Chiswick station, ½ mile; Turnham Green station, 1 mile.

Clarence Lodge, Clapham Park, S.W. Prop., Mrs. F. Thwaites. Med. Off., Dr. Percy Smith. Access—Clapham Rd., and Clapham Common (Electric), 15 minutes. Tel. No. 494 Brixton. *See also p.* 803

Featherstone Hall, Southall (for ladies). Res. Med. Lic., W. H. Bailey, M.D. Access — Southall station, 5 minutes.

Fenstanton, Christchurch Road, Streatham Hill. Res. Med. Supt., J. H. Earls, M.D. Access—Tulse Hill, or Streatham Hill, 5 minutes.

Flower House, Catford, S.E. Res. Med. Supt., Dr. C. C. Bullmore. Access — C. & D.R., Beckenham Hill, 5 minutes.

Halliford House, Sunbury-on-Thames, S.W. Res. Med. Supt., W. J. H. Haslett, M.R.C.S. Access—Sunbury station, 1¼ miles.

Hayes Park (for ladies), Hayes, Middlesex. Res. Med. Off., Dr. H. F. Stilwell. Access—Hayes, 2 miles.

Hendon Grove Asylum (for ladies), Hendon. Med. Lic., H. L. de Caux, L.M.S.S.A., L.S.A. (Lond.). Access—By M.R., Hendon station, ½ mile, or 'bus from Tube at Golder's Green.

London County Asylum, Banstead Downs, near Sutton, Surrey. Res. Med. Supt., Dr. P. C. Spark. Access—Belmont station, ½ mile; Sutton station, 1½ miles.

London County Asylum, Bexley, Kent. Res. Med. Supt., T. E. K. Stansfield, M.B. Access—Bexley station, 1¼ miles,

London County Asylum, Cane Hill, Coulsdon, Surrey. Acting Res. Med. Supt., Dr. E. S. Littlejohn. Access—Coulsdon, S.E.R., or Coulsdon and Smitham Downs, L.B. & S.C.R., 10 minutes.

London County Asylum, Claybury, Woodford Bridge, Essex. Acting Med. Supt., G. Foster Barham, M.D. Access—Woodford Bridge station, G.E.R., 1½ miles.

London County Asylum, Colney Hatch, N. Res. Med. Supt., S. J. Gilfillan, M.A., M.B. Access—New Southgate, G.N.R.

London County Asylum, Hanwell. Res. Med. Supt., Dr. P. J. Baily.

London County Asylum, Horton, Epsom. Res. Med. Supt., Dr. J. R. Lord. Access—L. & S.W. Ry., 1½ miles, L.B. & S.C.R., 1¾ miles. (*Temporarily in use as a War Hospital.*)

London County Asylum, Long Grove, Epsom. Res. Med. Supt., D. Ogilvy, M.D. Access—L. & S.W.R. and L.B. & S.C.R.

London County Asylum, The Manor, Epsom. Res. Med. Supt., W. Ireland Donaldson, M.D. Access—L. & S.W. and L.B. & S.C.R.

London County Colony (for Insane Epileptics), Epsom. Res. Med. Supt., Dr. M. A. Collins. Access—L. & S.W. & L.B. & S.C.R. stations, 1½ miles.

Middlesex County Asylum, Tooting, S.W. Med. Supt., R. Worth, M.B., B.S. Access—Wandsworth Common station, 1 mile.

Moorcroft House, Hillingdon, Uxbridge, 2 miles. Med. Licensees, Mr. J. F. Stilwell and Dr. R. J. Stilwell. Access—West Drayton station, 2 miles.

Newlands House, Tooting Bec Common, S.W. 17. Prop. and Res. Phys., Dr. J. Noel Sergeant. Access—Streatham Hill station, 1 m. Motor bus No. 49. *See also p.* 790

Northumberland House, Green Lanes, N. Res. Med. Supt., Bernard Hart, M.D. Access—Finsbury Park station, 1 mile. *See also p.* 800

Otto House, 47, North End Road, West Kensington (for ladies). Lic. Prop., A. H. Sutherland. Lady Supt., Miss Brodie. Access—West Kensington station, 1 mile; Barons Court station (Piccadilly Tube), 1 mile. *See also p.* 802

Peckham House, 112, Peckham Road, S.E. Props., A. H. & H. G. Stocker. Res. Med. Supt., Dr. F. R. King. Access—Peckham Rye stat., 10 min. walk. *See also p.* 799

St. Luke's Hospital, Old St., E.C. Res. Med. Supt., Wm. Rawes, M.D., F.R.C.S. Convenient to principal London stations. *See also p.* 772

The Priory, Roehampton, S.W., near Richmond Park. Res. Med. Supt., James Chambers, M.D. Access—Barnes station, 10 mins.

West Ham Boro' Asylum, Goodmayes, Ilford. Res. Med. Supt., Dr. John Custance Shaw. Access—Goodmayes, ¾ mile.

Wood End House, Hayes (ladies). Uxbridge, 3 miles. Med. Lic., Dr. R. J. Stilwell. Access—Hayes station, 1 mile.

Londonderry.—*District Asylum*. Res. Med. Supt., Dr. Hetherington. Access—Londonderry, 1 mile.

Macclesfield.—*Cheshire Coy. Asylum*, Parkside, and "*Uplands*" for private patients. Res. Med. Supt., H. Dove Cormac, M.B., M.S. Access—Macclesfield, 1 m. *See also p.* 775

Maidstone.—*Kent County Asylum*. Res. Med. Supt., H. Wolseley Lewis, M.D. Access—Maidstone, 1½ mls.

West Malling Place, Kent. Res. Med. Supt., Dr. G. H. Adam. Access—Malling station, 1 mile.

Market Lavington (Wilts).—*Fiddington House*. Res. Med. Supt., J. R. Benson, F.R.C.S. Access—Lavington, G.W.R., 1 mile; Devizes, 6 miles. *See also p.* 805

Maryborough (Queen's County).—*District Asylum*. Res. Med. Supt., Dr. P. Coffey. Access—Maryborough, ½ mile.

Melrose, N.B.—*Roxburgh, Berwick, and Selkirk District Asylum*. Res. Med. Supt., Patrick Steele, M.D. Access—Melrose, 1 mile.

Melton.—*St. Audry's Hospital for Mental Diseases*, near Woodbridge. Res. Med. Supt., J. R. Whitwell, M.B. Access—Melton station, 1¼ miles; Woodbridge station, 2¼ miles.

Merstham (Surrey).—*Surrey County Asylum*, Netherne. Med. Supt., Dr. P. C. Coombes. Access—Coulsdon station, 2 miles.

Middlesbro'.—*County Boro' Asylum*. Res. Med. Supt., Dr. J. W. Geddes. Access—Middlesbro', 2 miles.

Monaghan (Ireland).—*District Asylum*. Res. Med. Supt., Dr. T. P. Conlon. Access—Monaghan, ¼ mile.

Montrose, N.B.—*Montrose Royal Lunatic Asylum*. Med. Supt., C. J. Shaw, M.D. Access—Hillside, ¼ mile; Dubton, 1 mile.

Morpeth.—*Northumberland County Asylum*. Res. Med. Supt., Thos. W. McDowall, M.D. Access—Morpeth station, 1 mile, by 'bus.

Mullingar.—*District Asylum*. Res. Med. Supt., Dr. Laurence Gavin. Access—Mullingar station, 1 mile.

Newcastle-on-Tyne.—*City Asylum*, Gosforth. Res. Med. Supt., James T. Callcott, M.D. Access—Newcastle, 4 miles. (*Temporarily in use as a War Hospital.*)

Northampton.—*Berrywood Asylum*. Res. Med. Supt., W. Harding, M.D. Access—Castle station, 2½ miles; Midland station, 3 miles.

St. Andrew's Hospital, Northampton. Med. Supt., D. F. Rambaut, M.A., M.D. (T.C. Dub.) Access—Northampton station, 1 mile. *See also p.* 793

Norwich.—*Bethel Hospital for Mental Diseases.* Res. Med. Supt., S. J. Fielding, M.B. Cons. Phys., Saml. J. Barton, M.D. Access—Norwich (Thorpe) station, 1 mile.
See also p. 797

Heigham Hall, Norwich. Res. Med. Prop., J. G. Gordon-Munn, M.D. Access—Thorpe sta., 1½ mls.

Norfolk County Asylum, Thorpe, Norwich. Res. Med. Supt., D. G. Thomson, M.D. Access — Whitlingham, 1 mile ; Norwich, 2½ miles. (*Temporarily in use as a War Hospital.*)

Norwich City Asylum, Hellesdon, near Norwich. Res. Phys. and Supt., Dr. David Rice. Access—Hellesdon, 1 mile.

The Grove, Old Catton, near Norwich (for ladies). Res. Med. Supt., C. A. P. Osburne, F.R.C.S. Apply to the Misses McLintock.

Nottingham.—*City Asylum*, Mapperley Hill. Med. Supt., E. Powell, M.R.C.S.

Notts County Asylum, Nottingham. Res. Med. Supt., S. L. Jones, M.R.C.S. Access — Radcliffe-on-Trent, 2 miles.

The Coppice. Res. Med. Supt., David Hunter, M.B. (Camb.). Access—Midland station, 2½ miles ; Gt. Northern & Gt. Central station, 1½ miles. *See also p.* 794

Omagh.—*District Asylum.* Res. Med. Supt., Dr. John Patrick. Access—Omagh station, 2 miles.

Oxford.—*County Asylum*, Littlemore. Res. Med. Supt., T. S. Good, M.R.C.S. Access—Littlemore station.

The Warneford, Oxford, 1½ miles. Res. Med. Supt., Alex. W. Neill, M.D. Access—Oxford station, 2¼ miles. *See also p.* 803

Paisley.—*Craw Road Asylum.* Res. Med. Off., Mary P. Hislop, M.B., Ch.B. Access—Paisley, 1 mile.

Paisley District Asylum, Riccartsbar. Med. Off., D. Fraser M.D. Access—Paisley West, ¼ mile.

Renfrew District Asylum, Dykebar, Paisley. Res. Med. Supt., R. D. Hotchkis, M.D. Access—Paisley, 2¼ Miles.

Perth.—*District Asylum*, Murthly. Res. Med. Supt., Lewis C. Bruce, M.D. (*At present a War Hospital.*) Access—Murthly.

James Murray's Royal Asylum, Perth (for patients of the middle and upper classes). Phys. Supt., R. Dods Brown, M.D., F.R.C.P. Ed. Access—Perth station, under 2 mls.
See also p. 891

Plympton.—*Plympton House*, Plympton, South Devon. Res. Props., Dr. Alfred Turner and Dr. J. C. Nixon. Access—Plympton, 1 mile ; Marsh Mills, 2 miles ; Plymouth, 5 miles. *See also p.* 802

Portsmouth.—*Borough Mental Hospital.* Res. Med. Supt., H. Devine, M.D. (Lond.). Clerk and Steward. John C. Kersey. Access—Fratton, 1½ miles.

Prestwich (near Manchester).—*County Asylum.* Res. Med. Supt., Dr. F. Perceval. Acc.—Prestwich, ¾ mile.

Rainhill (nr. Liverpool).—*County Asylum.* Res. Med. Supt., T. P. Cowen, M.D. Access—St. Helens, 2½ miles ; Rainhill, 1 mile.

Rotherham (Yorkshire).—*The Grange*, 5 miles from Sheffield (for ladies). Con. Phys., W. C. Clapham, M.D. Res. Phys., G. E. Mould, M.R.C.S., L.R.C.P. Access—Grange Lane station, G.C.R., ½ mile.
See also p. 803

St. Albans.—*Herts County Asylum*, Hill End. Med. Supt., A. N. Boycott, M.D. Access—Hill End station, G.N.R., 2 minutes.

Middlesex County Asylum, Napsbury, near St. Albans, Herts. Res. Med. Supt., L. W. Rolleston, M.B., B.S. (*Temporarily in use as a War Hospital*). Access—Napsbury, 2 miles.

St. Leonards-on-Sea.—*Ashbrook Hall*, Hollington (for ladies). Res. Lics., Mr. and Mrs. Charles Somerset. Med. Off., Dr. Wm. E. Peck. Access—Warrior Square stat., 2 miles.

Salisbury.—*Fisherton House Asylum.* Res. Med. Supt., Dr. R. T. Finch. Access—Salisbury stat., L. & S.W. and G.W., 5 minute.

Laverstock House, Salisbury. Acting Med. Supt., Oswald Vevers, M.R.C.S., F.R.C.P. Access—Salisbury, 1½ miles.

Sevenoaks (Kent). — *Riverhead House* (for ladies). Res. Med. Supt., Dr. Hugh Munro. Access—Sevenoaks station, S.E.R., ¾ mile.

Shrewsbury.—*Shropshire County Asylum.* Res. Med. Supt., W. S. Hughes, M.B., B.S. Access — Shrewsbury station, 2½ miles.

Sleaford.— *Kesteven County Asylum.* Med. Supt., J. A. Ewan, M.A., M.D. Access—Rauceby, G.N.R., ¼ mile.

Sligo.—*District Asylum.* Res. Med. Supt., Dr. Joseph Petit. Access—Sligo station, 1½ miles.

Stafford.— *County Mental Hospital.* Res. Med. Supt., Dr. J. W. S. Christie. Access—Stafford, 1 mile.

Coton Hill Mental Hospital, Stafford. Res. Med. Supt., R. W. Hewson, L.R.C.S. & P. (Edin.). Access—Stafford, 1 mile.

Stirling. — *District Asylum*, Larbert. Med. Supt., Dr. R. B. Campbell. Access—Larbert, 1½ miles.

Stone (near Aylesbury).—*Bucks County Asylum.* Res. Med. Supt., H. Kerr, M.D. Access—Aylesbury station, 3¼ miles.

Talgarth.—*Brecon and Radnor Asylum.* Res. Med. Supt., R. Pugh, M.D.

Tamworth (Staffs.).—*The Moat House* (for ladies). Res. Licensees, Edward Hollins, M.A., and Mrs. S. A. Michaux. Access—Tamworth stat., ¾ mile. *See also p.* 796

Taunton. — *Somerset & Bath Asylum*, Cotford, near Taunton. Res. Med. Supt., Dr. H. T. S. Aveline. Access —Norton Fitzwarren stat., 2 miles.

Ticehurst (Sussex).—*Ticehurst House.* Res. Med. Supt., Dr. H. Hayes Newington. Access—Wadhurst, 4 miles, or Ticehurst Road, 3 miles.

Tonbridge. — *Redlands.* Res. Med. Supt., W. A. Harmer, L.S.A. Access —Tonbridge junc., 2½ miles.

Virginia Water. — *Holloway Sanatorium*, Hospital for the Insane. St. Ann's Heath. Res. Med. Supt., W. D. Moore, M.D. Asst. Med. Offs., T. E. Harper, L.R.C.P., G.W. Smith, M.B., Emma M. Johnstone, L.R.C.P. & S., and C. Rutherford, M.B. Access—Virginia Water station, 5 minutes. Seaside Branch, *St. Ann's*, Canford Cliffs, Bournemouth. Med. Off., C. E. C. Williams, M.D. *See also p.* 800

Wadsley (near Sheffield).—*South Yorkshire Asylum.* (*Temporarily in use as a War Hospital.*) Res. Med. Supt., W. J. N. Vincent, M.D. Access—Wadsley Bridge, 1 mile; Sheffield, 4 miles.

Wakefield. — *West Riding Asylum.* Res. Med. Supt., J. Shaw Bolton, M.D. Access—Kirkgate and Westgate station, 1 mile.

Wallingford (Berks.).—*Berkshire Asylum.*—Res. Med. Supt., Edwin L. Dunn, M.B. Access—Cholsey, 1 m.

Warlingham (Surrey).—*Croydon Mental Hospital.* Res. Med. Supt., E. S. Pasmore, M.D. Access — Upper Warlingham, 3¼ miles.

Warrington (Lancs.).—*Lancashire County Asylum*, Winwick. Access —Warrington, 2½ miles. (*Temporarily in use as The Lord Derby War Hospital*, Warrington. Lieut.-Col. A. Simpson, R.A.M.C., Administrator.)

Waterford. — *District Asylum.* Res. Med. Supt., Dr. Alexis Fitzgerald. Access—G.S. & W.R., North station, 2 miles.

St. Patrick's Private Asylum, Belmont Park. Conducted by the Brothers of Charity. Med. Supt., W. R. Morris, M.B. Access—Waterford station, 1 mile.

Wells.—*Somerset and Bath Asylum*, Wells, Som. Res. Med. Supt., Dr. G. Stevens Pope. Access—Wells station, 1½ miles.

Whitchurch (Salop).—*St. Mary's House* (ladies only). Res. Med. Supt., C. H. Gwynn, M.D. Access—Whitchurch, 1 mile. *See also p.* 805.

Whitefield (near Manchester). — *Overdale.* Res. Phys., P. G. Mould, M.R.C.S. Access—Prestwich and Whitefield station, 1½ miles.

Whittingham (near Preston). — *County Asylum.* Res. Med. Supt., Dr. J. F. Gemmel. Access—Whittingham station, 3 minutes.

Winchelsea (Sussex).—*Periteau*, near Hastings (for ladies). Physician, Harvey Baird, M.D. Access—Winchelsea station, 1 mile.

Woking.—*Surrey County Asylum*, Brookwood. Res. Med. Supt., J. A. Lowry, M.D. Access—Brookwood station, 1¼ miles.

Worcester.—*County & City Lunatic Asylum*, Powick. Res. Med. Supt., Dr. G. M. P. Braine-Hartnell. Access—Worcester station, 4 miles.

York.—*The Pleasaunce* (ladies only). Phys. Supt. and Res. Licensee, L. D. H. Baugh, M.B. Access—York, 1½ miles. *See also p.* 798

The Retreat, York. Res. Med. Supt., Bedford Pierce, M.D., F.R.C.P. (Lond.). Access—York station, 1½ miles. Also *Throxenby Hall*, a branch house, near Scarborough. *See also p.* 800

Bootham Park Registered Hospital, York. Res. Med. Supt., G. R. Jeffrey, M.D. Access—York stat., 1 mile. *See also p.* 805

North Riding of Yorkshire Asylum, Clifton. Res. Med. Supt., A. I. Eades. Access—York, 2 miles.

York City Asylum, Fulford, York. Res. Med. Supt., Dr. C. L. Hopkins. Access—Naburn, ½ mile.

MENTAL DEFICIENCY ACT, 1913:
CERTIFIED INSTITUTIONS AND HOUSES.

Class A.—Certified Institutions. *Class B.*—Institutions approved under Section 37.
Class C.—Certified Houses. *Class D.*—Approved Homes.

BUCKINGHAMSHARE.

Winslow Union Workhouse, Winslow.—20 male, 20 female, adults. Feeble minded and imbecile. Managers, Winslow Board of Guardians. (*Class B.*)

CHESHIRE.

Sandlebridge, near Alderley Edge.—290 males and females. Life care is provided, but only educable mentally defective children under 13 years of age are eligible for admission. Managers, Incorporated Lancashire and Cheshire Society for the Permanent Care of the Feeble Minded. Sec., Ed. M. Richards, 1, Brazennose Street, Manchester. (*Class A.*)

Hoole Home, 57, Hoole Lane, Chester.—(*Temporarily closed; now used as a War Hospital.*)

CORNWALL.

The Elizabeth-Barclay Home, Bodmin.—26 females. Matron, Miss E. Hunt; Hon. Sec., Miss E. M. S. Shaw. (*Class D.*)

CUMBERLAND.

Durran Hill House, Carlisle.—65 females. Feeble minded. Higher Grade. Managers, T. W. Hunter, T. Barnes, and R. Brisco. (*Class A.*)

DERBYSHIRE.

Hopewell Hall, Ockbrook.—50 males. Managers, The Nottingham and Notts Association for the Permanent Care of the Feeble Minded. (*Class A.*)

Whittington Hall, Whittington, near Chesterfield.—400 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

DEVON.

Western Counties Institution, Starcross.—380 males and females (trainable children). Managers, The Committee. (*Class A.*)

DORSET.

Kingsgate and Frithstow. West Moors, Wimborne.—12 females. Manager, Miss Bertha James. (*Class D.*)

DURHAM.

Monkton Hall Home for Lads, Jarrow-on-Tyne.—48 males. Secretary, J. Stewart, 90, Pilgrim Street, Newcastle. (*Class A.*)

ESSEX.

Etloe House, Church Road, Leyton.—122 females. Feeble minded, over 16. Managers, The Sisters of the Sacred Hearts of Jesus and Mary, Church Road, Leyton. (*Class A.*)

New Lodge, Leon House, Homestead and St. Keverne, Billericay.—56 males, of the middle class. Managers, The Co-operative Sanatoria, Ltd., T. W. Edwards, Secretary. (*Class A.*) *See also p.* 779

Poor Law Institution, Tendring, Weeley.—26 males, 26 females. Managers, Guardians, Tendring Union. H. J. Burden, Superintendent. (*Class A.*)

Royal Eastern Counties Institution, Colchester.—560 males and females, all grades. Managers, The Board of Directors. Address communications, The Medical Superintendent. (*Class A.*)

Thurlby House Special School, Woodford Bridge.—43 males. Manager, T. W. Hunter. (*Class A.*)

Gay Bowers, West Hanningfield, Chelmsford.—7 males. Managers, P. and G. Chennells. (*Class D.*)

FLINTSHIRE.

Walmer School for the Blind and Blind Deaf, Rhyl.—13 males and females. Feeble minded. Managers, Mrs. and Miss Roberts. (*Class D.*)

GLOUCESTERSHIRE.

Hanham Hall, Hanham, near Bristol.—240 males. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

Poor Law Institution, Stapleton.—11 males, 9 females. Managers, Bristol Board of Guardians. Superintendent, L. W. Williams. (*Class A, B, C* and *D.*)

Royal Victoria Home, Horfield.—42 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

St. Mary's Home, Painswick, near Stroud.—26 females. High grade feeble minded. Managers, Miss Wemyss, Washwell House, Painswick; S. G. Jones, Steanbridge House, near Stroud. (*Class A.*)

Stoke Park Colony, Stapleton, Bristol.—750 patients of both sexes (not exceeding 650 females or 300 males. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*) *See also p.* 804

Stoke Park Colony, West Side, Stapleton.—178 males. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

Mary Carpenter Home, Causeway, Fishponds, Bristol.—17 patients. Feeble-minded girls and women from 16 upwards. Managers, Hon. Sec., Mrs. Gilmore Barnett, 11, Victoria Square, Clifton; Hon. Treas., Mrs. F. F. Tuckett, Frenchay, near Bristol. (*Class D.*)

Royal Fort Home, Bristol.—15 females, high grade mentally deficient. Managers, Ladies' Committee. Hon. Sec., Miss Savill, 7, Woodland Road. (*Class D.*)

HAMPSHIRE.

St. Mary's Home, Alton.—45 mentally and morally deficient females. Managers, The Wantage Community of Sisters. (*Class A.*)

Poor Law Institution, Parkhurst, Isle of Wight.—5 males, 5 females. Supt., J. Mackeown. (*Class B.*)

HERTS.

St. Elizabeth's Home for Epileptics.—136 males and females. Apply to T. W. Hunter, Archbishop's House, Westminster, S.W. 1. (*Class A.*)

KENT.

Princess Christian's Farm Colony, Hildenborough.—Males and females. Managers, National Association for the Feeble Minded. Superintendent, Miss McCloskey. (*Class A* and *D.*)

LANCASHIRE.

Allerton Priory, R.C. Special Industrial School, Woolton, Liverpool. 106 male and female educable children. Superintendent, Sister M. Prisca. (*Class A.*)

Brockhall, Whalley, near Blackburn.—231 females. Feeble minded, imbeciles, and moral imbeciles. Managers, Mental Deficiency Acts Committee, Lancashire Asylums Board, Preston. (*Class A.*)

'*Pontville*,' *R.C. Special School, Ormskirk.*—106 boys. Mentally Defective. Managers, Sisters of the Sacred Hearts of Jesus and Mary; Correspondent, Right Rev. Monsignor Canon Pinnington, 109, Great Mersey Street, Liverpool. (*Class A.*)

Royal Albert Institution, Lancaster.—491 males, 250 females. Managers, The Central Committee of the Royal Albert Institution, Lancaster. (*Class A.*) *See also p.* 804

The Macalpine Rescue Home, 350, *Moss Lane, East Manchester* (temporary premises)—7 females. Managers, The Committee; Hon. Sec., Miss Macalpine. (*Class A.*)

Seafield House, Waterloo Road, Seaforth, near Liverpool.—208 males and females. Managers, Guardians of the West Derby Union, Liverpool. (*Class B.*)

York Villa, Cropton Road, Formby.—4 females under 16 (private cases). Manager, Miss Bowyer, Formby. (*Class C.*)

LEICESTERSHIRE.

'*Cross Corners*,' *Loughborough Road, Leicester.* 20 females. Feeble minded. Managers, Leicester Corporation Mental Deficieney Committee. (*Class A.*)

LONDON.

Clifton House, 127, *Uxbridge Road, Shepherd's Bush, W.*—40 females. Feeble minded and moral imbeciles. Managers, The Church Army, Bryanston Street, W. (*Class A.*)

39, *Downs Road*, 41, *Downs Road*, 46–48, *Pembury Road, N.E.*—80 females. *Managers*, Committee of Girls' Training Homes, Clapton. (*Class A.*)

Kensington Workhouse. 30 females. Managers, Guardians of the Poor of the Parish of St. Mary Abbots, Kensington. (*Class A.*)

Springfield Lodge, Grove Hill Road, Denmark Hill.—28 females. Managers, Salvation Army. (*Class A.*)

The Helping Hand Home, 16, *Cathcart Hill, N.*—30 females. High grade mentally deficients. Managers, Committee; Hon. Sec., Mrs. Geoffrey Russell, 39, Mecklenburgh Square, W.C. (*Class A.*)

Woolwich Workhouse, Plumstead, S.E.—25 males and females. Temporary. Sent by L.C.C. only. Managers, Board of Guardians of the Woolwich Union. E. G. Manning, Supt. (*Class B.*)

MIDDLESEX.

All Souls' Special School, Field Heath House, Hillingdon.—89 females. Educable and imbeciles. Manager, T. W. Hunter. (*Class A.*)

Bramley House, Clay Hill, Enfield.—45 females. Managers, Committee for the Care of the Mentally Defective, Middlesex County Council. (*Class A.*)

'*Crathorne*,' *Oak Lane, East Finchley, N.*—32, consisting of women with their infants. Managers, Northern Heights Branch of the National Association Feeble Minded; Hon. Sec., Mrs. Moss-Blundell. (*Class A.*)

'*Enfield House*,' 19, *Chase Side Crescent, Enfield, Middlesex.*—40 males. Managers, Guardians of Edmonton Union. Superintendent, E. B. Willett. (*Class A.*)

Warkworth House, Isleworth.—38 boys. Managers, Middlesex County Council. Superintendent, A. Milsom. (*Class B.*)

'*Arniston*,' *The Grove, Isleworth.*—20—10 males under 14, 10 females. Managers, Misses J. M. and M. D. Isbister. (*Class C.*) *See also* p. 792.

'*Normansfield*,' *Hampton Wick.* 120 males and females. Manager, Dr. Langdon-Down. (*Class C.*)
See also p. 802

'*The Gables*,' *Upper Teddington Road, Hampton Wick.*—18 male and female children. Manager, Miss Frances M. Deck. (*Class C.*)

Alexander House, 117, *High Street, Uxbridge*.—24 females over 16. Managers, Committee. Hon. Secretary, Mrs. Western. *Class D.*

'*Conifers*,' *Hampton Wick*.—10 females. Manager, Dr. Langdon-Down. (*Class D.*)

'*Trematon*,' *Hampton Wick*. 12 males. Manager, Dr. Langdon-Down. (*Class D.*)

NORFOLK.

The Lodge, Bowthorpe Road, Norwich.—20 females. Managers, The Guardians of the Poor of the Norwich Incorporation. (*Class A.*)

Reedham Old Hall, Reedham.—30 females, children and girls. Superintendent and Proprietress, Miss S. A. Huntly. (*Class D.*)

NORTHUMBERLAND.

Prudhoe Hall Colony.—185, all classes. Managers, Northern Counties Joint Poor Law Committee. Clerk, J. W. Coulson, Poor Law Offices, South Shields. (*Class B.*)

Home of Industry, Bon Villa, Morpeth.—16 females. Feeble minded. Superintendent, Miss A. Pawsey. (*Class D.*)

OXFORDSHIRE.

(1) *Cumnor Rise, Oxford* (2) 19, *New Inn Hall Street, Oxford*.—46 females. High-grade feeble-minded. Managers, Committee. Hon. Secretary, Honble P. Bruce. (*Class A.*)

SOMERSET.

Clevedon Hall, Clevedon.—58 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

Leigh Court, Abbot's Leigh, near Bristol.—280 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

Rock Hall House, Combe Down, Bath. 18 males, 19 females. Managers, Bath Municipal Charity Trustees. (*Class A.*)

Long Ashton Poor Law Institution, Flax Bourton, near Bristol.—5 males, 5 females. Managers, Guardians Long Ashton Union. Superintendent, J. C. Hole. (*Class B.*)

STAFFORDSHIRE.

Burton Poor Law Institution.—2 males, imbecile; 1 female, idiot. Managers, Guardians Burton Union. Master, R. Bareham. (*Class A.*)

New Cross Institution Mental Wards, Wolverhampton.—Cases accepted only from Wolverhampton County Borough Council. Managers, Guardians of the Poor of the Wolverhampton Union. (*Class B.*)

SUFFOLK.

St. Joseph's Home, Sudbury.—11 females. Manager, Rev. A. Peacock. (*Class A.*)

Handford Home, Ranelagh Road, Ipswich.—20 females. Managers, The Committee. (*Class D.*)

SURREY.

Croydon Union House, Queen's Road, Croydon.—20 males, 3 females. Managers, Croydon Board of Guardians. (*Class A.*)

Royal Earlswood Institution.—650. Managers, Board of Management. (*Class A.*)

SUSSEX.

Avonhurst, Burgess Hill.—20 private cases only, males and females under 16. Manager, Margaret Macdowall. (*Class C.*) *See also p.* 779

Hastings and St. Leonards Special School for Blind and Partially Blind Children who are also Mentally Defective, Backward, or Exceptional.—32 males and females. Manager, Principal.

St. Paul's House, Upper Maze Hill, St. Leonards-on-Sea.—For delicate, backward, or exceptional senior girls. School for juniors in separate house and grounds. Managers The Principals. (*Class C.*)

WARWICK.

Agatha Stacey Homes, Redual, near Birmingham.—40 females; and *Enniskerry, Knowle.*—24 females. Managers, The Central Committee, 158, Broad Street, Birmingham. (*Class A.*)

Midland Counties Institution, Knowle, near Birmingham.—87 males, 54 females. Managers, The Committee. Superintendent, A. H. Williams. Medical Officer, J. O. Hollick, M.B. (*Class A.*)

Monyhull Colony, King's Heath, Birmingham.—288 males, 318 females. Managers, Guardians of the Poor of the Birmingham Union. Clerk and Solicitor, R. J. Curtis, Union Offices, Edmund Street, Birmingham. (*Class B.*)

WILTS.

Devizes Union Workhouse.—9 females. Managers, Devizes Board of Guardians. (*Class A.*)

Pewsey Union Workhouse, Pewsey.—4 females. Managers, Pewsey Board of Guardians. (*Class B.*)

Poor Law Institution, Semington, near Trowbridge.—24 females. Managers, Guardians Trowbridge and Melksham Union. Clerk, E. A. Newth, Trowbridge. (*Class B.*)

The Workhouse, Chippenham.—Managers, Guardians of the Chippenham Union. (*Class B.*)

WORCESTERSHIRE.

Evesham Union Workhouse.—Certified only for dealing with cases arising in the Evesham Union Area. J. H. Damen, Superintendent. (*Class A.*)

Poor Law Institution, Sedgley (Stafford).—50 males, 50 females. Managers, Guardians of the Dudley Union. (*Class A.*)

YORKSHIRE.

Mid-Yorkshire Institution, Whixley, York.—70 males, 50 females. Managers, The Mid-Yorkshire Joint Board. Medical Superintendent, F. P. Hearder, M.D. (*Class A.*)

The Grange, Altofts, Normanton.—15 females, good class. Mentally deficient, epileptics. Manager, Mrs. Howard. (*Class C.*)

INSTITUTIONS FOR INEBRIATES.

LICENSED UNDER THE ACTS, 1879–1900.

The patient must sign a Form expressing a wish to enter the Home, before a magistrate. This can be done at the private residence of the patient, or at the retreat, if previous notice has been given. Two friends must also sign a declaration that they consider the patient an 'Inebriate' within the meaning of the Acts.

* NOTE:—Ashford is a Roman Catholic Religious Institution.

† Cinderford, Erdington, Herne Hill, Terrington St. Clement, and Torquay are C.E.T.S. Institutions.

MALES ONLY.

Buntingford (Herts).—*Buntingford House Retreat.* Apply, Med. Supt., Dr. G. M. Smith. Access—Buntingford, G.E.R., 8 minutes.

Cockermouth (Cumberland).—*Ghyllwoods.* Res. Med. Prop., Dr. J. W. Astley Cooper. Access—Cockermouth, 11 miles. (*Closed during the War, owing to Proprietor's engagement at Military Hospital*).

Folkestone.—*Capel Lodge*, near Folkestone. Res. Prop., E. Norton, M.D. Access—Folkestone June., 2 miles.

Rickmansworth (Herts).—*Dalrymple House.* Apply to Res. Med. Supt. Access—Rickmansworth station, Great Central & Metropolitan Railway, ½ mile; L. & N.W.R., 1 mile.

See also p. 789

FEMALES ONLY.

Ashford (Middlesex).*— *Ecclesfield.* Med. Supt., Dr. M. F. Cock. Apply, Mother Superior. Access—Ashford station, 1 mile. *See also p.* 789

Belfast. — *The Lodge Retreat,* Irwin Avenue, Strandtown. Med. Attendant, R. W. Leslie, M.D.

Beverley (E. Yorks). — *Albion House.* Med. Supt., Dr. George Savege. Hon. Sec., Mrs. T. R. Pentith, The Limes, Sutton-on-Hull.

Erdington, near Birmingham.† — *Corngreaves Lodge.* Lady Supt., Miss Knapman. Med. Off., Dr. Featherstone. Access—Gravelly Hill station, ¼ mile.

Herne Hill.† — *Ellison Lodge,* Half Moon Lane. Res. Supt., Miss Rossiter. Med. Supt., Dr. C. E. Finny. Access—Herne Hill, 10 minutes; North Dulwich, 3 mins. Telephone: 1162 Brixton. *See also p.* 789

Leicester.—*Melbourne House.* Prop., Mr. H. M. Riley. Med. Attendant, R. Sevestre, M.A., M.D. Camb. London Consultant, W. Wynn Westcott, M.B. (Coroner N.E. London), 396, Camden Road, Holloway. Dublin Consultant, Sir Wm. J. Smyly, M.D., F.R.C.P.I., 58, Merrion Square, Dublin. Nat. Tel., 769 Leicester. Station, 2 miles. *See also p.* 789

Newmains (N.B.).—*Newmains Retreat* for ladies. Access — Hartwood station, Cal. Railway, 2 miles.

Reigate (Surrey). — *Duxhurst,* for women of all classes. Under the Superintendence of Lady Henry Somerset. Med. Supt., A. Walters, M.R.C.S. Access—Reigate, 4 mls.

Spelthorne St. Mary (Bedfont, Middlesex).—Apply to the Sister Superior, C.S.M.V. Access — Feltham, S.W.R., 1 mile.

Terrington St. Clement† (Norfolk). — *Hamond Lodge.* Res. Supt., Miss Yolland. Med. Supt., S. R. Lister, M.R.C.S. Access—Terrington station, 1½ miles. *See also p.* 789

Torquay.† — *Temple Lodge.* Res. Supt., Sister in Charge. Med. Off., W. Odell, F.R.C.S. Hon. Sec., Mrs. H. Erskine. *See also p.* 789

REFORMATORIES CERTIFIED UNDER THE INEBRIATES ACT, 1898.

MALE AND FEMALE.

Bristol. — *Brentry Certified Inebriate Reformatory,* Westbury-on-Trym. Res. Supt., Capt. Lay; Med. Off., Dr. Ormerod. Hon. Sec., Rev. H. N. Burden. Access—Clifton Down, Redland, or Patchway stat., 3½ mls.

FEMALES ONLY.

Langho (Lancashire). — *Lancashire Inebriate Reformatory,* Langho, near Blackburn. For Lancashire cases. Res. Supt. and Med. Off., Dr. F. A. Gill. Access—Langho station, 1½ miles.

UNLICENSED HOMES.

Beckenham (Kent). — *Norwood Sanatorium,* The Mansion, Beckenham Park. Med. Supt., F. Hare, M.D. Access—Beckenham Junc. station, 10 minutes. *See also p.* 790

Dublin. —*Farnham House,* Finglas. Res. Med. Supt., H. P. D'Arcy Benson, M.D. Access—Dublin, 2 miles.

London.—*London Sanatorium,* 150, Harley Street, W. Res. Med. Supt., C. A. McBride, M.D.

Maldon (Essex). — *Osea Island* (for ladies and gentlemen). Vis. Phys., H. I. Price, F.R.C.S. Prop., F. N. Charrington, Esq.

SANATORIA FOR CONSUMPTION AND OTHER FORMS OF TUBERCULOSIS.

Aberchalder (N.B.). — *Inverness-shire Sanatorium.* Med. Supt., D. S. Johnston, M.D. Access—Aberchalder, 2 miles.

Aysgarth, S.O. (Yorks).—*Wensleydale Sanatorium.* Physicians, D. Dunbar, M.B., B.S., and W. N. Pickles, M.B., B.S. Access—Aysgarth, ½ mile, via Northallerton, N.E.R., and Hawes Junction, M.R.

See also p. 724

Banchory (Scotland). — *Nordrach-on-Dee.* Res. Phys., D. Lawson, M.A., M.D. Access—Banchory, 1½ miles.

Barrasford (Northumberland). — *The Newcastle-on-Tyne and Northumberland Sanatorium.* Res. Med. Supt., Dr. Cecil G. R. Goodwin. Access—Barrasford, N.B.R., 3½ ms.

Belbroughton (Worcs.).—*Bourne Castle Sanatorium.* Res. Phys., W. Bernard Knobel, M.D. Access — Hagley, G.W.R.

Benenden (Kent). — *Sanatorium* of "National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis." Two Res. Med. Officers. Apply, Steward. Access —Biddenden, 3 miles.

Bingley (Yorks.).—*Eldwick Sanatorium* (school for phthisical children). Med. Off., Dr. Margaret S. Sharp. Access—Bingley station, 2 miles.

Birmingham (near).—*Romsley Hill Home for Consumptives*, Halesowen. Res. Med. Off., Dr. P. Allan. Access—Hunnington, Mid. & G.W.R., 2 miles.

Bolton (Lancs.). — *Wilkinson Sanatorium for Consumptives*, Sharples. Med. Off., Dr. J. D. Marshall.

Bournemouth.—*Royal National Sanatorium for Consumption and Diseases of Chest.* Sec., A. G. A. Major. Res. Med. Off., W. Bertram Lawrence. Access—Bournemouth Central, 1¼ miles, Bournemouth West, ½ mile.

The Firs Home (for advanced cases). Hon. Sec., Dr. W. Willes, Bournemouth. Hon. Med. Offs., C. P. Woodstock, M.D., and S. G. Champion, M.D. Lady Supt. Miss Ingram. Access — Bournemouth Central, ½ mile.

The Home Sanatorium, West Southbourne, near Bournemouth. Res. Med. Supt., J. E. Esslemont, M.B., Ch.B. Access—Bournemouth Central, 2½ miles; Boscombe, 1½ miles; Christchurch, 2½ miles.

See also p. 724

Bridge of Weir (Renfrewshire).—*Consumption Sanatoria of Scotland.* Hon. Treas., Sir Joseph Maclay, Bart., 21, Bothwell Street, Glasgow. Med. Supt., James Crocket, M.D. Access — Bridge of Weir, 2 miles.

Brighton. — *Municipal Sanatorium*, for Brighton townsfolk only (early pulmonary and joints). Med. Supt., Dr. Duncan Forbes, M.O.H. for Brighton. Particulars, Town Hall, Brighton.

Chagford (Devon).— *Dartmoor Sanatorium.* Res. Med. Supt., Dr. C. H. Berry. Access — Moretonhampstead, G.W.R., 6 miles.

See also p. 725

Chelmsford (Essex). — *Great Baddow Sanatorium.* Med. Supt., A. Lyster, M.D. Access—Chelmsford, G.E.R.

Cheltenham. — *Cranham Lodge Sanatorium*, Stroud, Glos. Res. Med. Supts., A. H. Hoffman, M.D., and Geoffrey A. Hoffman, M.B.— Access—Cheltenham, 8 miles.

Salterley Grange Sanatorium, near Cheltenham. Res. Med. Supt., Dr. E. G. Glover. Access—Leckhampton, 2½ miles.

Chesterfield (Derbyshire). — *Ashover Sanatorium.* Med. Supt., Dr. Ida E. Fox. Access—Stretton, M.R., 3½ miles.

Danbury (Essex).—*Alfred Boyd Memorial Sanatorium* (for ladies), Little Giberacks, Essex. Med. Supt., A. Lyster, M.D.

Darlington.—*Felix House*, Middleton St. George, Co. Durham. Res. Med. Supt., C. S. Steavenson, M.B. Access—Dinsdale, N.E.R., 5 minutes.

Devon and Cornwall *Sanatorium*, Didworthy, South Brent. For consumptive poor of the two counties. Sec., S. Carlile Davis, Esq., Law Chambers, Princess Square, Plymouth. Res. Med. Supt., Dr. W. B. Livermore. Access—Brent, G.W.R., 2 miles.

Doneraile (Co. Cork).—*Cork County and City Sanatorium*, Heatherside. Res. Med. Supt., Dr. R. Ahern. Access—Buttevant, G.S. & W.R., 5 miles.

Dublin. — *Peamount Sanatorium*, Hazelhatch, Dublin. Med. Supt., A. H. Hanley, C.M.G., F.R.C.S.I. Access—Lucan or Hazelhatch, Gt. Southern Railway.

Dundee (near), *Sidlaw Sanatorium*. Med. Supt., H. E. Fraser, M.D., Royal Infirmary, Dundee. Access —Auchterhouse station, 1½ miles.

Durham.—*Durham County Consumption Sanatoria*. Sec., Mr. F. Forrest, 54, John Street, Sunderland. For men : Stanhope, Med. Supt., Lieut.-Col. John Gray, R.A.M.C. Access—Stanhope station, 1 mile. For women and children : Wolsingham, Med. Supt. Dr. Menzies. Access—Wolsingham station, ¾ m.

Edinburgh.—*Royal Victoria Hospital for Consumption*. Under the Corporation of the City of Edinburgh, and the supervision of the Public Health Department, City Chambers, Edinburgh.

Eversley (Hants). — *Moorcote Sanatorium*. Res. Med. Supt., J. G. Garson, M.D. Access—Wellington College station, 4½ miles ; Wokingham station, 6 miles ; Fleet, 6 miles.

Farnham (Surrey).—*Whitmead Sanatorium*, Tilford, near Farnham. Med. Supt., Geo. Fleming, M.B. Access—Farnham station, 3½ mls.

Fortbreda, Belfast.— *Forster Green Hospital for Consumption and Chest Diseases*. Res. Med. Off., Dr. J. A. Harbison. Sec., J. Osborne, Scottish Provident Building, Belfast. Access—Belfast, 2 miles.

Frimley (Surrey).—*Brompton Hospital Sanatorium*. Res. Med. Supt., Dr. W. O. Meek. Access — Frimley station, 2 miles. *See also p.* 769

Grange - over - Sands. — *Westmoreland Sanatorium*. Res. Med. Supt., C. F. Walker, M.D. Access—Grange-over-Sands station, 2¾ miles.

Hastings. — *Fairlight Sanatorium*, in connection with Margaret Street Hospital for Consumption (for Out-Patients), 26, Margaret St., W. Sec., Mrs. M. C. Hawthorne. Med. Off., Dr. N. F. Stallard. Access—Hastings, tram, about 15 minutes.

Heswall (Cheshire). — *West Derby, Liverpool, and Toxteth Park Joint Sanatorium for Children*. Med. Supt., J. B. Yeoman, M.D. Matron Miss Bateson. Access—Heswall, 1½ miles.

Hull. — *Hull and East Riding Convalescent Home*, Withernsea. Sec., Benjamin Brooks, Royal Infirmary, Hull. Med. Off., A. E. Sproulle, L.R.C.P. Access—Withernsea stat.

Isle of Wight. — *Royal National Hospital for Consumption*, Ventnor. Senr. Res. Med. Off., Dr. D. Morrison Smith. Sec., Charles W. Cox, 18, Buckingham Street, Strand, W.C. Access—Ventnor, 1 mile.

St. Catherine's Home, Ventnor (for early cases of phthisis in children). Apply Sister-in-Charge. Med. Off., H. F. Bassano, M.A., M.B. Access—Ventnor, 5 mins. drive.

Kingussie, N.B. — *Grampian Sanatorium*. Res. Med. Supt., W. de Watteville, M.D.

Kinross-shire (Scotland).— *Ochil Hills Sanatorium*, Milnathort. Res. Med. Supt., James Aberdein Milne, M.B., Ch.B., D.P.H. Access — Milnathort, 3 miles.

Kirkcaldy.—*Sanatorium for Consumption*. Med. Supt., Dr. G. W. McIntosh. Sec., The Town Clerk. Access—Kirkcaldy, 1 mile.

Lanark.—*City of Glasgow Sanatorium*, Bellefield, Lanark. Phys. Supt., Dr. J. W. Allan. Access—Lanark, 20 minutes.

Lanchester (Durham). — *Maiden Law Sanatorium*. Med. Off., Dr. W. M. Morison. Sec., W. H. Ritson. Access — Annfield Plain station, 1 mile.

Lancing-on-Sea, Worthing. — *Southern Convalescent Homes and Sanatorium.* Med. Off., A. E. Rouse, L.R.C.P. Sec., W. Chorley, 6, Clephane Road, Canonbury, N.
See also p. 725

Leeds. — *Leeds Sanatorium for Consumptives,* Gateforth, near Selby, and *Leeds Hospital for Consumptives,* Armley. For poor of Leeds. Sec., C. H. Sedgwick, 37, Great George St., Leeds.

Liverpool. — *Liverpool Sanatorium for Consumptives,* Kingswood, Frodsham. Sec., Liverpool Hospital for Consumption, Mount Pleasant, Liverpool. Res. Physician, Alfred Adams, M.D. Access—Frodsham, L. & N.W.R., 3½ miles.

Park Hill Sanatorium, Liverpool. Acting Med. Supt., Walter Crane, M.D.

Llanybyther (Carmarthenshire). — *West Wales Sanatorium.* The Welsh National Memorial to King Edward VII. Res. Med. Supt., Dr. G. D. H. Wallace. Access — Llanbyther station, 3 miles.

London. — *City of London Hospital for Diseases of Chest,* Victoria Park, E. Res. Med. Off., Dr. S. Roodhouse Gloyne. Sec., Geo. Watts. Access—Cambridge Heath, Bus or Tram, 5 mins.

Mount Vernon Hospital for Consumption and Diseases of the Chest, Northwood. Access — Northwood (Met. & G.C. Rly.). Hon. Vis. and Res. Staff. Out-patient department, 7, Fitzroy Square, W. Secretary, W. J. Morton.

Royal Hospital for Diseases of the Chest, 231, City Road, E.C. Apply to the Secretary.

Long Stratton (Norfolk). — *Fritton Sanatorium.* Med. Director, Dr. Annie McCall, 165, Clapham Road, S.W. Access — Forncett station, G.E.R., 4 miles.

Manchester. — *Hospital for Consumption and Diseases of Throat and Chest,* Bowdon; *Crossley Sanatorium,* Delamere, Cheshire. (For poor and working classes, after personal examination at Manchester.) Sec., C. W. Hunt, Manchester. Res. Phys. (Bowdon), Dr. A. Vrebos; (Delamere), G. Heathcote, L.R.C.P. & S.

Margate (Kent). — *Royal Sea-bathing Hospital* (for Surgical Tuberculosis). Sec., A. Nash, 13, Charing Cross, S.W. Access — Margate West, ¼ mile.

Mendip Hills. — *Mendip Hills Sanatorium,* Wells, Somerset. Res. Phys., D. J. Chowry Muthu, M.D. Access—Wells station, 3 miles.
See also p. 725

Nordrach-upon-Mendip, Blagdon, near Bristol. Res. Phys., R. Thurnam, M.D. Access—Burrington station, 5 miles.

Midhurst (Sussex). — *King Edward VII Sanatorium.* Res. Med. Supt., T. T. Cockill. Access—Midhurst, 4 miles.

Nayland (Suffolk). — *East Anglian Sanatorium, and Maltings Farm Sanatorium* for poorer men and women patients, *and East Anglian Children's Sanatorium.* Med. Supt., Dr. Jane Walker, 122, Harley Street, W. Access—Bures station, G.E.R., 3½ miles.

New Cumnock (Ayrshire). — *Ayrshire Sanatorium,* Glenafton. Res. Med. Supt., E. E. Prest, M.D. Access—New Cumnock, 3 miles.

Norfolk. — *Keiling Sanatorium,* Holt. Acting Res. Med. Supt., Dr. W. J. Fanning. Access—Holt, 1½ miles.

Mundesley Sanatorium, Mundesley. Res. Phys., S. Vere Pearson, M.D. Access—Mundesley, 1 mile.

Northampton. — *Northamptonshire Sanatorium,* Creaton. Res. Med. Supt., Dr. Gilbert Aubrey. Access—Brixworth, L. & N.W.R., 3 miles.

Nottingham. — *Ransom Sanatorium,* Sherwood Forest, Mansfield. Res. Med. Off., Dr. Ethel Dukes. Access—Mansfield, 3 miles.

Oban, Scotland. — *Argyll County Sanatorium.* Vis. Med. Off., Duncan MacDonald, M.D. Access—Oban, 1 mile.

Ockley (Surrey). — *Ockley Sanatorium.* Res. Med. Supt., Dr. Clara Hind. Access—Ockley, L.B. & S.C.R., 1 mile.

Painswick, near Stroud (Glos.).—*Painswick Sanatorium.* Res. Phys. and Prop., W. McCall, M.D. Access—Stroud, 4 miles; Gloucester, 6 miles.

Peebles.—*Manor Valley Sanatorium.* Med. Off., C. B. Gunn, M.D. Access—Peebles, 4 mls., Lyne, 2 mls.

Penmaenmawr (N. Wales).—*Nordrach in Wales, Pendyffryn Hall.* Res. Phys., Dr. G. Magill Dobson, and Dr. Geraty.

Peppard Common (Oxon). — *Berks. and Bucks. Joint Sanatorium.* Res. Chief Med. Officer, Dr. Esther Carling. Access—Reading, 6½ miles.

Ringwood (Hants). — *Linford Sanatorium.* Res. Phys., H. G. Felkin, M.D., A. de W. Snowden, M.D., and H. A. F. Wilson, M.R.C.S. Access—Ringwood station, 2½ miles.

Rudgwick (Sussex).—*Rudgwick Sanatorium.* Vis. London Phys., Dr. Annie McCall, 165, Clapham Road, S.W. Access—Rudgwick station, 5 minutes; Horsham stat., 7 miles.

Ruthin (N. Wales). — *Vale of Clwyd Sanatorium, Llanbedr Hall.* Res. Prop., Dr. G. A. Crace-Calvert. Access—Ruthin station, 2 miles.
See also p. 724

St. Leonards.—*Eversfield Chest Hospital,* West Hill. Res. Phys., T. Gambier, M.D. Access — West St. Leonards, S.E.R., West Marina, L.B. and S.C.R., within 5 minutes' walk.

Sandon, near Chelmsford (Essex). — *Merivale Sanatorium.* Res. Phys., H. N. Marrett, M.R.C.S. Access—Chelmsford station, G.E.R., 3½ miles.
See also p. xxxiv

Sheffield. — *City Hospitals for Consumptives,* Crimicar Lane (for males); Commonside (for females). Med. Supt., H. J. E. H. Williams, M.D. Tuberculosis Med. Off., J. Rennie, M.D.

Shirlett, near Broseley (Shropshire). — *King Edward VII Memorial Sanatorium.* Med. Supt., Dr. T. R. Elliott. Access — Much Wenlock station, 3 miles.

Skipton (Yorks).—*Eastby Sanatorium.* Res. Med. Supt., Dr. Catharine Arnott. Access—Embsay station, 2 miles.

Stannington (Northumberland). — "*Philipson*" *Children's Sanatorium.* Matron, Miss S. M. Robson. Two Vis. Physicians. Access—Stannington station, 3 miles.

Threlkeld (Cumberland). — *Blencathra Sanatorium.* Res. Med. Supt., Dr. W. Goodchild. Access—Threlkeld, C.K. & P.R., 2 miles.

Torquay.—*Western Hospital for Incipient Consumption,* Torquay. Open Oct. to May. Sec., F. Manley. (*Temporarily in use as a War Hospital.*)

Warrenpoint (Co. Down). — *Rostrevor Sanatorium.* Res. Phys., B. H. Steede, M.D. Access—Warrenpoint.
See also p. 725

Wicklow. —*The Royal National Hospital for Consumption for Ireland.* Newcastle, Wicklow. Res. Med. Off., Dr. F. O'B. Kennedy. Access—D. & S.E.R. to Newcastle, Co. Wicklow, 3 miles.

Winsley, near Bath. — *Winsley Sanatorium.* Senr. Res. Med. Off., Dr. H. W. M. Rees. Sec., Frederic Jones. Access — Limpley Stoke station, 1 mile.

Wokingham. —*Pinewood Sanatorium.* Res. Med. Supt., F. K. Etlinger, M.R.C.S. Access — Wellington College, S.E.R., 2 miles; or Wokingham, S.W.R., 3½ miles.

Worcester (near). —*Knightwick Sanatorium.* Res. Med. Supt., Dr. H. Gordon-Smith. Access—Knightwick, N.W.R., 1½ mile.

HYDROPATHIC ESTABLISHMENTS.

Ben Rhydding (Yorkshire).—*Ben Rhydding Hydro.* Phys., Dr. F. J. Stansfield and Dr. W. R. Bates. Access—Station, a few hundred yards.

Birmingham.—*The City Hydropathic and Massage Establishment*, 275, Broad Street. Proprietor, Robert Schenkel (*Swiss*). *See also p.* 777

Bournemouth (Hampshire).— *Bournemouth Hydropathic.* Res. Phys., W. J. Smyth, M.D. Access—East station, 1½ miles; West station, ¼ mile.

Bristol. — *The Bristol Hydropathic* College Green. Res. Phys., W. J. Spoor, M.B., M.R.C.S. Access—Temple Meads, 1¼ miles.

Bute.— *Kyles of Bute Hydropathic*, Port Bannatyne, Rothesay. Man., A. Menzies. Med. Supt., Dr. A. J. Hall. Access—Clyde steamers call daily.

Buxton.—*Buxton Hydro Hotel.* Manager, G. W. Bosworth. Access—Station, 4 minutes.

Caterham (Surrey).—*Caterham Sanitarium and Surrey Hills Hydropathic.* Res. Med. Supt., A. B. Olsen, M.D. Access— Caterham station. *See also p.* 788

Clifton (near Bristol).— *Clifton Grand Spa and Hydropathic.* Access—Clifton Down station, 1 mile; Bristol station, 1½ miles.

Cork.—*St. Ann's Hill Hydropathic.* Res. Med. Supt., Dr. R. H. Barter. Access—Blarney station, 2½ miles; Muskerry Light Railway from Cork, 8 miles.

Crieff.—*Strathearn Hydro* (17 miles from Perth). Res. Med. Supt., T. Gordon Meikle, M.B., C.M. Access—Crieff station, 1 mile.

Eastbourne.—*Eastbourne Hydropathic.* Access—Eastbourne station, 5 min. drive.

Edinburgh. — *Hydropathic*, Slateford. (*Temporarily used as a War Hospital.*)

Forres.—*Cluny Hill Hydropathic.* Vis. Phys., Dr. John Adam. Access—Forres station, 1 mile; Inverness, 24 miles.

Grange-over-Sands.—*Hazlewood Hydropathic.* Access—Carnforth, L. & N.W.R., then by Furness Railway; Grange-over-Sands, ¼ mile.

Harrogate (Yorkshire.)—*Harlow Manor Hydro.* Man., Miss Oakley.

The Harrogate Hydropathic Lim. Phys., Dr. Hinsley Walker. Man., W. Taylor. Access—Harrogate station, ½ mile.

Hexham (Northumberland).— *Tynedale Hydropathic.* Prop., F. G. Grant. Med. Supt., Dr. D. Stewart. Access—Hexham, 1 mile; Newcastle, 19 miles.

Ilfracombe.—*The Cliffe Hydro.* (*Temporarily used as an Officers' Hospital.*)

Ilkley (Yorkshire).— *Craiglands Hydro.* Res. Physicians, Henry Dobson, M.D., C.M. (Edin.). and Maurice R. Dobson, M.B., B.S. (Lond.), L.R.C.P., M.R.C.S, (Eng.). *See also p.* 786

The Spa Hydro. Hotel, Ilkley, Manager, J. S. Brodie. Vis. Phys.. Dr. Henry Veale. Access—Ilkley, 3 minutes.

Limpley Stoke (near Bath).— *West of England Hydropathic.* Access—Limpley Stoke station. Apply, the Secretary.

Malvern.—*The Malvern Hydropathic.* Res. Phys., J. C. Fergusson, M.D. Access—Great Malvern station, ¼ mile.

Wyche-side Hydropathic. Access—Malvern Wells station, G.W.R., ½ mile; Great Malvern station, 2 miles.

Imperial Hotel, Malvern. The Manager. *See also p.* 787

Matlock.— *Rockside Hydropathic*, Matlock. Med. Supts., Drs. Marie Goodwin (Res.), and Dr. Morton. Access—Matlock, ½ mile.

Royal Hotel and Baths, Matlock Bath. (*Temporarily used as a Hospital for Canadian Officers.*)

Smedley's Hydropathic, Matlock. Res. and Vis. Physicians. Access—Matlock station, ½ mile; omnibus. *See also p.* 783

Moffat.— *The Moffat Hydropathic.* Man., Miss Gardner. Med. Supt., Dr. D. Huskie. Access—Moffat station, 1 mile.

Peebles.—*Peebles Hotel Hydropathic.* Complete modern equipment of baths and electrical treatment. Plombières treatment for mucous colitis. Fango di Battaglia (mud packs for sciatica, etc.). Res. Phys., Thomas D. Luke, M.D., F.R.C.S. Edin. Access—N.B. and Cal. stations about 10 to 15 mins. walk.

Shandon.— *Shandon Hydropathic.* Consulting Phys., Dr. Wm. R. Sewell. Access—Shandon, 5 mins.

Southport (Birkdale Park).— *Smedley Hydropathic.* Phys., J. G. G. Corkhill, M.D. Southport or Birkdale stations. *See also p.* 786

Kenworthy's Hydropathic, Southport. Res. Phys., Dr. Kenworthy. Access—Chapel Street (L. & Y.). Telephone, 80. Telegrams: "Kenworthy's, Southport." *See also p.* 786

Tunbridge Wells.— *The Spa.* Access—Station, about 1 mile; London, 34 miles. Apply, Manager.

Ulverston.— *Conishead Priory Hydropathic.* Visiting Physician, Dr. R. Ashburner. Access—Ulverston station, 1¾ miles.

NURSING INSTITUTIONS AND PRIVATE HOMES FOR INVALIDS.

NURSING INSTITUTIONS.

Leeds.—*Leeds Trained Nurses' Institution*, 21, Hyde Terrace, Leeds. Apply Superintendent. Tel. 177. Telegrams: "Expert, Leeds."

Liverpool.—*Male and Female Nurses' Institution*, Hope House, Hope St. *See also p.* 774

London.—*Associated Male Nurses and Masseurs* (Trained at The National Hospital), 36, Grafton Rd., Acton. W. Secretary, A. Sharman.

Co-operation of Temperance Male and Female Nurses, 60, Weymouth Street, W. Secretary, M. Sullivan.

Incorporated Society of Trained Masseuses, 157, Great Portland Street, W. *See also p.* 771

Male Nurses' Association, 29, York Street, Baker Street, W.1. Sec., W. J. Hicks. *See also p.* 773

Mental Nurses' Co-operation, 49, Norfolk Square, W.2. Lady Supt. Miss Jean Hastie. Access—Paddington, 7 minutes. *See also p.* 772

National Temperance Male and Female Nurses' Association, 27, Cambridge Gardens, W. Sec., R. H. McKie.

St. Luke's Hospital, Old Street, E.C. Trained Nurses for Mental and Nervous Cases. Apply Lady Supt., 19, Nottingham Place, W.1 *See also p.* 772

Temperance Male Nurses' Co-operation, Ltd., 43, New Cavendish Street, W.; also at Manchester, Glasgow, and Dublin. Apply, Secretary. *See also p.* liv

The Nurses' Association, 29, York St., Baker St., W.1. Sec., W. J. Hicks; Supt., Mrs. Millicent Hicks. *See also p.* 773

York.—*The Retreat* (Trained Nurses' Department, for mental and nervous cases only). *See also p.* 800

PRIVATE HOMES FOR INVALIDS, MATERNITY HOMES, INSTITUTIONS FOR SPECIAL TREATMENTS, Etc.

Alderley Edge (Cheshire).—*The David Lewis Colony* (for Sane Epileptics), and *Colthurst House School* (for epileptic boys). Res. Director, Alan McDougall, M.D. Access—Alderley Edge, 3 miles.
See also p. 779

Alresford (Hants).—*Beauworth Manor.* Invalids, any cases except insanity. Speciality: Neurosis. Apply Res. Superintendent. Access—Alresford, 5 miles, Winchester, 8 miles.
See also p. 777

Bath.—*Lansdown Hospital and Nursing Home,* Bath (invalids only; special arrangements for patients suffering from gout, rheumatism, and physical infirmities). Med. Supts., Dr. Percy Wilde and Dr. Wells-Beville. Access—M. or G.W. stations, 1 mile. *See also p.* 774

Church Stretton (Salop). — *Church Stretton Nursing Home,* "Ashford House." Apply, Misses Nicholls and Silverlock.

Edinburgh. — *Queensberry Lodge,* for ladies. Supt., A. Miller. Med. Supt., Dr. William Russell. Access—Waverley station, ½ mile.
See also p. 776

Epsom (Surrey).—*Abele Grove.* Nerve Cases of all kinds, as well as Invalids, received into retired Physician's Home. Apply to Resident Physician.

Hadlow Down, Buxted (Sussex).—*South Beacon* (for the care and treatment of gentlemen mentally affected, but not ill enough to be certified). Prop., Philip H. Harmer. Access—Buxted, 3 miles; Mayfield, 4 miles; Heathfield, 4 miles.
See also p. 778

Hastings.—*St. Helen's House.* Neurasthenia, Hysteria, War Shock and Convalescents. Res. Prop., Dr. Molyneux. *See also p.* 790

Jedburgh.—*Abbey Green* (for Invalids and War Convalescents). Res. Prop., Wm. Blair, M.D. Access—N.B.R., Jedburgh. Telephone: No. 3. *See also p.* 777

London.—*Faraday House,* 85, West Side, Clapham Common, S.W. Medical, electricity, radiant heat, radium, Weir Mitchell, and Nauheim treatment. Apply Secretary.
See also p. 775

Radium Institute, 16, Riding House Street, W. Med. Supt., A. E. Hayward Pinch, F.R.C.S.
See also p. 775

St. Thomas's Home, St. Thomas's Hospital, Westminster Bridge. Apply, The Steward, St. Thomas's Hospital, S.E. Access—Waterloo, 5 minutes. Tel.: Hop. 1637.
See also p. 776

New Brighton. — *Convalescent Home for Women and Children.* Hon. Sec. and Treas., Frank Holt, Esq., 8, Cook Street, Liverpool. Lady Supt., Miss K. R. Bolton.
See also p. 776

Peebles, N.B.—*St. Ronan's* (for two or three mild mental cases). Med. Supt., Thomas D. Luke, M.D. Access—Peebles, ¼ mile.
See also p. 778

Ryde, I.W. — *St. Luke's Home* for epileptic churchwomen, Ryde, I.W. Med. Supt., S. Churchill, M.A., M.B. (Cantab.). Address, Deaconess.
See also p. 779

Tunbridge Wells. — *Mount Ephraim Nursing Home,* 8, Molyneux Park. Medical, surgical, Weir-Mitchell, and massage cases. Excellent facilities for open-air treatment. Apply, Miss Baxter. Access — S.E. & Chatham Station, 10 mins.
See also p. 777

Whitchurch, Salop.—*St. Mary's House.* Limited number of mild mental cases (ladies). Dr. and Mrs. Gwynn
See also p. 805

PRINCIPAL BRITISH SPAS,

With Indications for their Therapeutical Employment.

Revised by N. Hay Forbes, F.R.C.S. Edin., F.R.S. Edin. (Church Stretton).

Bath (Somerset). — Sheltered from the N. and N.E. winds by a range of hills from 600 to 800 feet high; 2 hours from London (Paddington), 12 miles from Bristol. Rainfall, 32·7 inches in 1914, and sunshine, 1666 hours. Climate mild and equable.

Waters.—The only *hot* springs, and the only *winter* spa, in Great Britain. Three springs yield over half a million gallons of water daily; the temperature of the hottest is 120° F. The waters contain sulphates of calcium, strontium, sodium, and potassium, with calcium carbonate, the chlorides of magnesium, sodium, and lithium.

Therapeutic indications.—Gout, chronic rheumatism, rheumatoid arthritis, sciatica, disorders of the digestive organs, anæmia, skin diseases, functional nervous disorders and debility.

Baths.—Modern baths of every description, including Aix douche massage, deep baths, electric, water and hot air, natural vapour, needle, intestinal douches for muco-membranous colitis and allied conditions, sulphur, Nauheim, and Zander medico-mechanical treatment.

Nursing and Baths.—Lansdown Grove House (*See p.* 774).

Bridge of Allan (Stirlingshire). — 422 miles from London, 3 miles north of Stirling. Sheltered from the north and east winds by the Ochil Hills. On the direct route to London, and within an hour's rail journey of Edinburgh and Glasgow. Average rainfall 33·24 inches. Climate mild and equable all the year.

Waters.—Natural mineral waters from six springs (Airthrey), at a depth of about 116 feet, exceedingly rich in saline, the chief ingredients being various salts of calcium, sodium, and magnesium. These waters are once more coming into great prominence.

Therapeutic indications.—Chronic affections of the liver, stomach, and bowels, in many chest diseases, and in rheumatism, gout, sciatica, and other nerve affections, also in some diseases of the skin.

Baths.—Excellent suite of baths, with skilled attendants.

Buxton (Derbyshire) (*See also p.* 732).—The Mountain Spa, 1000 feet above sea level, 3½ hours from London (St. Pancras), 23 miles from Manchester, 30 from Sheffield, 53 from Liverpool. Bracing climate. Lowest absolute humidity of any health resort in Great Britain.

Waters.—Thermal springs 82° F. Powerful radio-active properties. More highly charged with nitrogen gas than any other spring. Chalybeate spring, rich in protocarbonate of iron.

Therapeutic indications.—Gout, rheumatism, rheumatoid arthritis, sciatica, nervous diseases, skin diseases, especially those of gouty origin, malaria and other tropical diseases, colitis, anæmia, phlebitis, and diseases of women.

Baths.—Over 100 different treatments. Every proved balneological and accessory treatment installed. Recent official report of Devonshire Hospital gives percentage of cures as 88·6 per cent, extending over last five years. (*See also p.* 784.)

Boarding Establishment.—The Buckingham Boarding Establishment (*See p.* 788).

Cheltenham (Gloucestershire).—184 feet above sea level, 3 hours from London. Rainfall, 27·5 inches in 1914, and sunshine, 1576 hours. Town very free from fogs. Protected from N. and N.E. winds. Good water supply and modern sanitation.

Waters.—The mineral waters are of two kinds. One is alkaline (Pittville) from contained sodium carbonate, the only one of this type in Great Britain. The other is impregnated with the sulphates of soda and magnesia. They are now receiving considerable attention from the medical profession, and seem likely to successfully compete with Carlsbad, Marienbad, and Vichy in attracting a portion of the patients formerly sent abroad.

Therapeutic indications.—Gout, dyspepsia, metabolic disorders generally, chronic gastric and hepatic troubles, and neurasthenia.

Baths.—Good modern baths, with massage.

Church Stretton (Salop).— 613 feet above sea level, in the 'Highlands of England,' 4¼ hours from Euston, 3¾ hours from Paddington, 1½ hours from Birmingham, 2½ hours from Liverpool and Manchester, and 2½ hours from Bristol. Air noted for its extreme purity, bracing, with a somewhat tranquillizing influence, and a generally invigorating climate. Hills 1250 to 1700 feet high. Prevailing wind, S.W. Rainfall, 35·18 inches in 1914. Modern drainage. Porous soil.

Waters.—Said to be the purest in Great Britain. Found to be useful in gout, rheumatism, chronic renal affections, arterio-sclerosis, and gastric catarrh.

Therapeutic indications.—Specially the 'open-air' cure of neurasthenia, for sequelæ of influenza, for insomnia, functional nervous diseases, chronic gout and rheumatism, chronic gastric and bronchial catarrh, debility from over-work, and convalescence after illness or operation. 'Terrain cure,' and special physical exercises for obesity, myocardial atony, early arteriosclerosis, hepatic inadequacy and constipation. A good 'after-cure' resort from Bath, Buxton, Cheltenham, Droitwich, Leamington, and Llandrindod Wells.

Droitwich (Worcestershire) (*See also p.* 785).—150 feet above sea level, 2½ hours from London (Paddington), 19 miles from Birmingham, 6 from Worcester. Rainfall about 23 inches. Mean winter temperature 47° F., summer 69·9° F. Well protected from N. and N.E. winds.

Waters.—The most powerful saline in the world. The brine is pumped from 200 feet below the ground level. Temperature 54° F., and is heated by introducing steam. It is 10 to 12 times as strong as that of the ocean (Channel), containing in every gallon 20,000 grains of saline in excess of any known waters: the waters possess radio-active properties.

Therapeutic indications.—Chronic muscular and articular rheumatism, rheumatoid arthritis, chronic articular or irregular gout, neuritis, sciatica, neuralgia, heart diseases, especially those of myocardium—effect similar and equal to Nauheim treatment—neurasthenia, anæmia, chlorosis, some sclerotic diseases of spinal cord, dry, scaly skin diseases, e.g., chronic eczema and psoriasis.

Baths.—Immersion, douche, needle, vapour, swimming, Aix-douche, Nauheim baths, etc.

Hotel.—Worcestershire Brine Baths Hotel, and Brine Baths (*See p.* 785).

Harrogate (Yorkshire). (*See also p.* xxxiv).—450 feet above sea level, 4 hours from London, 18 miles from Leeds. Unequalled by any Continental spa, especially for the treatment of gout and its complications. The climate is stimulating and fairly dry—bracing moorland air. Rainfall in 1914, 31·22 inches, and sunshine, 1468 hours.

Waters.—Celebrated for the medicinal properties of its 87 springs—sulphurous, chalybeate, alkaline, and saline. 'Aquaperia' aperient mineral water is bottled at Harrogate by Camwal Ltd. (*See p.* 717).

Therapeutic indications.—Anæmia, chlorosis, gout, rheumatism, disorders of liver and stomach, muco-membranous colitis, chronic appendicitis, and skin diseases.

Baths.—There are four establishments, where nearly 70 treatments are given, including sulphur baths, douche, Nauheim, vapour, Russian, Turkish, electric, mineral, electric light, ozone, throat and nasal (*See also p.* xxxiv).

Ilkley (Yorkshire).— Situated on the southern slope of the valley of the Wharfe, rising rapidly from the bank of the river to a height of 1320 feet above sea level. Occupying a sheltered position. Annual rainfall, about 32 inches. Mean annual temperature 48° F. Death-rate 8 per 1000. Being close to extensive moors the air is bracing and exhilarating and at the same time dry and soft, having a wonderfully restorative effect upon invalids as well as on Anglo-Indians, delicate children, and convalescents.

Waters.—The water supply obtained from springs is remarkably pure, bright and sparkling. Chalybeate waters. Saline.

Therapeutic indications.—Gout, rheumatism, neuritis, neurasthenia, anæmia, asthma, and bronchitis cases are benefited. The treatment adopted is that known as hydro-therapeutic.

Baths.—Complete suites of baths are to be found in the numerous establishments. Electrical, Weir-Mitchell.

Hydropathic Establishment.—Craiglands Hydropathic (*See p.* 786).

Leamington Spa (Warwickshire) (*See also p.* xxxiii.)—195 feet above sea level, 1 hour 30 minutes from London (Paddington or Euston), 24 miles from Birmingham. Equable and mild climate, with low rainfall, 24·6 inches in 1914, total bright sunshine 1495 hours. Westerly winds prevail.

Waters.—Saline, resembling those of Homburg, but more generally useful.

Therapeutic indications.—Muscular and articular rheumatism, gout, rheumatoid arthritis, neuralgia and neuritis, diseases arising from a plethoric condition of the chylopoietic viscera, eczema and other irritative disorders of the skin, conditions of increased vascular tension and chronic interstitial nephritis.

Baths.—Turkish, medicated, swimming, and electric of all kinds (*See also p.* xxxiii).

Llandrindod Wells (Radnorshire).—Situated in Central Wales, at an altitude of 750 feet. About 5 hours from London. It lies in the centre of a plateau of hills rising in places to over 2000 feet. Sheltered from the east, and open to the south and west. The soil is porous, and dries up quickly after rain. The climate is extremely bracing. Rainfall, 41·11 inches in 1913.

Waters.—There is a great variety of mineral waters—saline, sulphurous, iron, magnesium, chloride of calcium, and lithia springs similar in composition to those at Kissingen and Homburg. Slightly aperient and strongly diuretic.

Therapeutic indications.—The diseases most benefited are those in which any digestive derangements are present, the various forms of gout and rheumatism, rheumatoid arthritis. neuritis and fibrositis, gall-stones and biliary stasis, renal calculus, or any kidney or bladder condition requiring diuresis, and in neurasthenia, or debility from over-work or convalescence.

Llangammarch Wells (Breconshire).—In an open valley surrounded by moorland, 600 feet above sea level. 5¾ hours from London. Mean annual temperature in 1914, 48·1° F. Sunshine in 1914, 1320 hours, and rainfall 58·6 inches in 1914. Well protected from the east, and prevailing wind is S.W.

Water.—Saline, containing the chlorides of barium (6¾ grains per gallon), calcium, magnesium, lithium, and sodium ; the only one of its kind in the British Isles. The barium salt has a physiological action on cardiac muscle similar to that of digitalis and strophanthus, and is also a good diuretic. Administered both internally and externally. Temperature 56° F. ; is heated for bathing purposes. A modified Nauheim system of baths (immersion, douche, and needle), exercises, massage, and hill climbing is carried out.

Therapeutic indications.—Cardiac diseases, organic and inorganic, especially affections of the myocardium due to influenza. Graves's disease, chronic muscular and articular rheumatism, osteo-arthritis, gout, sciatica, and neurasthenia.

Hotel.—Lake Hotel (*See p.* 788).

Malvern (Worcestershire).— Situated at an altitude of 520 feet above sea level, on eastern slope of Malvern Hills (9 miles long and rising to 1400 ft.), 2½ hours from London (Paddington), and about 1 hour from Birmingham. Original home of hydropathy. Soil gravelly (syenitic detritus). Air dry and bracing, cool in summer and warm in winter. Rainfall, 30 inches in 1914. Mean annual temperature 50·6° with low daily variation, daily mean of bright sunshine in 1914, 4·47 hours. Total sunshine in 1914 1631 hours. Lowest death-rate of any inland watering-place. Sanitation perfect.

Waters.—Mainly spring, of remarkable purity, free from organic matter, less than 4 grains of earthy salts per gallon.

Therapeutic indications.—Gout, rheumatism, rheumatoid arthritis, neuralgia, sciatica, lumbago, dyspepsia, constipation, anæmia, bronchial nephritic, and cutaneous diseases.

Baths.—Natural pure brine (from Droitwich), Turkish and electric baths. Vichy massage and Aix douches, Fango-di-Battaglia.

Matlock Bath (Derbyshire).— 300 to 800 ft. above sea level, 3½ hours from London (St. Paneras), 46 miles from Manchester, 16 from Derby. Rainfall in 1914, 35·0 inches, and sunshine, 1321 hours. Very sheltered.

Waters.—Thermal Springs. Mild sulphated alkaline—saline waters at 68° F., containing 33 grains per gallon of salts, mainly magnesium and calcium bicarbonate, and magnesium sulphate. Owing to their peculiarly soft and unctuous character they are especially valuable in bathing and douche operations, particularly those associated with massage, such as the 'Aix' and 'Vichy' douches.

Therapeutic indications.—Rheumatism, gout, rheumatoid arthritis, neuritis, neurasthenia, catarrhs (bronchial, gastric, or enteric), anæmia, cardiac asthenia, chronic diseases of the liver or kidneys, digestive and biliary disorders.

Baths.—A complete modern installation exists for the administration of all kinds of baths, douches, packs, and other hydropathic treatment, electricity, massage, inhalations, Nauheim baths, with Swedish exercises.

Fango-di-Battaglia.—The volcanic mineral deposit from the hot springs near Padua (N. Italy) is imported, and extensively used in the treatment of gout, rheumatoid arthritis, and neuritis.

Matlock Bank (*Matlock* station, one mile by rail from Matlock Bath).— 300 to 800 feet above sea level, 3½ hours from London (St. Paneras), 45 miles from Manchester, 17 from Derby. South-westerly aspect, and well sheltered from the north. Climate mildly bracing. Sunshine above the average. The Matlock system of hydropathic treatment is carried out in all its branches, and the principal Hydros are installed with latest electric baths and appliances, including high-frequency, Dowsing radiant heat and light. Schnee four-cell, *x* rays, etc. They also include Turkish, Russian, plunge, medicated and inhalation baths, Aix and Vichy douches.

A feature of the Matlock Hydros is that, as a rule, they are complete in their own grounds, and contain croquet and tennis lawns, and bowling and putting greens, which, as a means of recreation and exercise, form a valuable auxiliary to a course of hydropathic treatment.

Hydropathic Establishments.—Smedley's Hydropathic (*See p.* 783).

Peebles (Peebleshire, N.B.).—500 ft. above sea level. One hour from Edinburgh and 8 from London (via Galashiels). Rainfall, 27 inches. Bracing climate, but sheltered from the north winds. Mean annual mortality rate 11 per mil. Population 6000 in winter, and 10,000 in summer.

Waters.—The waters are of the halothermal type, similar to Kissingen and Kreuznach. The chief ingredient is chloride of sodium. They are obtained from the famous St. Ronan's Well (6 miles east).

Therapeutic indications.—The waters are specially suited to the Nauheim and Bourbon Laney treatment of cardiac disease, and in this respect seem likely to compete with the above-mentioned continental resorts, patients being saved the long journey, and also, after the baths, are conveyed by lift immediately to their rooms for resting. The waters are also suited to dyspepsia, gout, rheumatism and neurasthenia.

Baths.—The baths at the hydropathic are of the most modern type. Complete electrical installation and mud baths (Fango-di-Battaglia).

Hydropathic Establishment.—Peebles Hotel Hydropathic.

Nursing Home.—St. Ronan's, Peebles.

Ripon (Yorkshire).—Situated on rising ground near the junction of the Rivers Ure and Skell. On the N.E. Railway, 4¾ hours from London. 120 feet above sea level. Climate mild but bracing. Soil, gravel and sand, and dries quickly after rain. Prevailing winds, W. and S.W. Surrounding country well wooded and very beautiful, Fountains Abbey and many other places of interest are within easy reach. The Yorkshire Moors are only a few miles from the City.

Waters.—Saline Sulphur Water brought down from Aldfield Spa, 4 miles distant, to the New Baths erected in 1904.

Therapeutic indications.—Chronic and subacute gout, rheumatism, rheumatoid arthritis, chronic skin diseases (eczema, psoriasis, acne), catarrhs, gastric and liver derangements.

The Baths have been lately equipped with up-to-date electric apparatus.

Strathpeffer Spa (Ross-shire, N.B.).— In the Highlands of Scotland. 180 to 300 feet above sea level. Sheltered from N. and N.E. winds. Prevailing wind S.W. Sandy soil. Bracing air. Sunshine in 1914, 1167 hours, and rainfall, 30 inches.

Waters.— Sulphurous and chalybeate. Former, very rich in sulphuretted hydrogen gas and sulphates. Four sulphur wells in use : (1) Old well ; (2) Upper ; (3) Strong ; (4) Cromartie. No. 4 contains over 19 cubic inches H_2S to gallon. Sulphates, the predominating salt. Have strong diuretic and mild aperient action.

Therapeutic indications.—Chronic and subacute gout and rheumatism (especially articular), rheumatoid arthritis, chronic skin diseases (eczema, acne, psoriasis), especially when gouty or rheumatic, chronic disorders of the digestive system, chronic gastric or intestinal catarrh, sluggish portal circulation, congested liver, biliary and urinary calculi, neurasthenia, anæmia, obesity, chronic metallic poisoning, dilatation of heart, neuritis.

Baths.—Sulphurous (immersion), inhalation, peat, douche (Aix and Vichy), needle, pine, Russian, Nauheim, radiant heat (electric), and high-frequency current.

Trefriw Wells (Carnarvonshire).— A chalybeate spa in the Conway valley, one mile from Llanrwst station (L. & N.W.Ry.) ; 5 hours by rail from London. The climate is bracing, the air soft, pure, and mostly of a westerly or south-westerly type ; it is recommended for the convalescent and the neurasthenic.

Waters.—Two varieties : (1) The aluminous chalybeate, and (2) the sulpho-magnesian chalybeate ; the former contains 4·36 grains per ounce of crystalline ferrous sulphate, and the latter 1·95 grains per ounce of the same salt. Used internally, and externally in the form of baths.

Therapeutic Indications.—All those morbid conditions in which iron is indicated ; conditions which, as a rule, mainly depend on some degenerative or destructive changes in the blood. For the so-called 'metabolic' diseases, which chiefly consist in some digestive inefficiency, some incomplete elimination of food-toxins and other various waste products, and

some defective blood-formation. Useful in certain chronic skin diseases e.g., psoriasis, eczema, acne, and impetigo. Also suitable for the anæmia of 'granular kidney,' for some types of chronic catarrhal disease of mucous membranes, and for the usual forms of round-worm and tape-worm. The initial doses are small, usually from 2 or 3 teaspoonfuls to one or two tablespoonfuls gradually increased, being taken from first to last under strict medical supervision.

Tunbridge Wells (Kent).—400 feet above sea level, 1 hour from London (Charing Cross, S.E.C.R.), 30 miles from Hastings. Mean winter temperature 41·3° F., summer 55·9° F. Lies upon a bed of sandstone. Climate is tonic and invigorating. Prevailing winds W. and S.W.

Water.—A weak non-aerated, chalybeate spring, containing 4 grains ferrous carbonate to the gallon, with sulphates and chlorides of potash, soda, and calcium.

Therapeutic indications.—(Climatic) diseases of respiratory organs (bronchitis, asthma, and phthisis), early cardiac cases, diseases of digestive organs, gout and rheumatoid arthritis, and especially diseases of nervous system (neurasthenia and mental depression), also in convalescence and some infantile disorders. Waters indicated in anæmia, chlorosis, and allied conditions.

Baths.—Immersion, douche, needle, Turkish, Russian, vapour and swimming, medicated and electric light.

Nursing.—Mount Ephraim Nursing Home (*See p.* 777).

Woodhall Spa (Lincolnshire) (*See also p.* 784).—Built upon ironstone sand, through which the rain percolates very rapidly. Midway between Boston and Lincoln, about 3 hours from London (King's Cross). Average rainfall, 22½ inches. Air bracing, and uncontaminated, from moors and pine woods. Excellent new water supply.

Waters.—Bromo-iodine waters, rich in the chlorides of sodium, calcium, and magnesium, with bromine and iodine.

Therapeutic indications.—Rheumatism (chronic articular and muscular), lumbago, arthritis deformans, gouty arthritis, sciatica, neuritis, paralysis, neurasthenia; injuries to joints; skin diseases, psoriasis, urticaria; diseases peculiar to women; diseases of throat and nose; liver disorders.

Spa Baths.—Recently enlarged. Immersion, shower, undercurrent and local douches; Aix and Vichy douche massage; Nauheim, electric and Schnee baths; Dowsing radiant heat and light baths; Bergonie treatment; nose, throat and eye mineral sprays and douches; Russian and Berthollet vapour; electric ionic and *x*-ray treatments; massage and Swedish exercises. Particulars, apply Medical Superintendent.

Hotel.—Victoria Hotel (*See p.* 784).

Helouan, Egypt.—Sixteen miles from Cairo by train, 200 feet above the Nile, which is about three miles from the town. Celebrated for its wonderfully dry, warm, and yet bracing climate, the amount of sunshine in the winter months, and its convenient position for seeing many of the antiquities of Egypt. The amount of bright sunshine from November to March averages 8·3 hours a day, as against 1·4 in London. The diurnal variations are small, the air is fresh by day and night and very free from dust. The average annual rainfall is about ¾ of an inch.

Waters.—Strong sulphur waters, which are used internally and externally in various ways, but especially in the Helouan Bath (New Bath Establishment), in which massage is given while a stream of water at the desired temperature passes freely through the bath. This water rises at a temperature of 91° F.

Therapeutic indications.—Gout, rheumatism, the various forms of chronic arthritis, fibrositis and neuritis, neurasthenia, chronic nephritis, and for those requiring a dry, not relaxing, warm climate.

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	Christ Church Mission Hall, Shroton St., Marylebone	E. C. Greenwood, L.R.C.P., 1, Hanover Hse, St. John's Wood Park, N.W.8	Fri. ; 3 (beginning in Feb. May & Nov.
	St. Olave's and St. John's Institute, Tooley St., S.E.	V. A. Jaynes, M.R.C.S., .. 157, Jamaica Road, Bermondsey, S.E.16	Wednesday; 2 (except August)
	Royal Free Hospital, Gray's Inn Road, W.C.	Mrs. F. E. Willey, M.D., 31, Devonshire Place, W.1	*
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Dentists' Register—Yearly 3/4—Constable, 10, Orange Street, W.C.2.
Dermatology, British Journal of—Quarterly; 21/- per annum—H. K. Lewis & Co. Lim., 136, Gower Street, W.C.1.
Dublin Journal of Medical Science—20/- per annum—Fannin & Co. Lim., 41, Grafton Street, Dublin.
Edinburgh Medical Journal—Monthly 2/-—W. Green & Son Lim., Edinburgh.
Glasgow Medical Journal—Monthly 2/-—A. Macdougall, Mitchell St., Glasgow.
Guy's Hospital Gazette—Fortnightly 6d.; 7/6 per annum—Ash & Co. Lim., Henry Street, Bermondsey, S.E.1.
Guy's Hospital Reports—Yearly 10/6—7, Great Marlborough Street, W.1.
Heart: A Journal for the Study of the Circulation—Quarterly, 20/- per annum—Shaw & Sons, 7, Fetter Lane, E.C.4.
Homœopathic Journal, British—Monthly 1/-—Bale, 83–91, Great Titchfield Street, W.1.
Homœopathic World—Monthly 6d.—12, Warwick Lane, E.C.4.
Hospital—Weekly 1d.; 8/8 per annum—28, 29, Southampton Street, W.C.2. (*See Advertisement.*)
Hygiene, Journal of—Occasionally, 7/- each—Fetter Lane, E.C.4.
Immunology, Journal of—Six times per annum 23/-—Cambridge University Press, Fetter Lane, E.C.4.
Indian Medical Gazette—Monthly 21/- per annum—Thacker & Co., 2, Creed Lane, E.C.4. (*See Advertisement.*)
Inebriety, British Journal of—Quarterly 1/-—Baillière, 8, Henrietta Street, W.C.2.
Lancet—Weekly 8d.; 30/- per annum—423, Strand, W.C.2. (*See Advertisement.*)
Laryngology, Rhinology, and Otology, Journal of—30/- per annum—Adlard & Son and West Newman, Bartholomew Close, E.C.1. (*See Advertisement.*)
Laryngoscope, The—Monthly 25/- per ann.—Baillière, 8, Henrietta St., W.C.2.
Liverpool Medico-Chirurgical Journal—Half-yearly, 2/6 each—H. K. Lewis & Co. Lim., 136, Gower Street, W.C.1.
London Hospital Gazette—6/- per annum—5, Rupert Street, E.
Medical Annual—Yearly 10/-—John Wright & Sons Lim., Bristol.
Medical Directory—Yearly 16/-—Churchill, 7, Great Marlborough St., W.1.
Medical Magazine—Monthly 1/-—44, Bedford Row, W.C.1.
Medical Officer—Weekly 6d.; 21/- per annum—36–38 Whitefriars Street, E.C.4. (*See Advertisement.*)
Medical Press and Circular—Weekly 6d.; 21/- per annum—Baillière, 8, Henrietta Street, W.C.2. (*See Advertisement.*)

Medical Register—Yearly 10/6—Constable, 10, Orange Street, W.C.2.
Medical Review—Monthly 1/8—70, Finsbury Pavement, E.C. 2.
Medical Temperance Review—Quarterly 6d.—Adlard & Son and West Newman, Bartholomew Close, E.C. 1.
Medical Times—Weekly 2d.—49 & 50, Watling Street, E.C. 4.
Medical Who's Who—Yearly 10/6 net—The Fulton-Manders Publishing Co., 51, High Holborn, W.C. 1. (*See Advertisement.*)
Medical World—Weekly 1½d.—47, Fleet Street E.C. 4. (*See Advertisement.*)
Medical Students' Register—Yearly, 2/6—Constable, 10, Orange Street, W.C. 2.
Mental Science, Journal of—Quarterly 5/-—7, Great Marlborough Street, W. 1.
Microscopical Science, Quarterly Journal of—10/-—J. & A. Churchill, 7, Great Marlborough Street, W. 1.
Middlesex Hospital Journal—3/6 per annum—140, Wardour Street, W. 1.
Midland Medical Journal—Monthly 4d.—Greswolde House, Birmingham.
Midwives' Roll—Yearly 10/6—Spottiswoode, 5, New Street Square, E.C. 4.
National Dental Hospital Gazette—Monthly from Oct. to March, 3/- per annum—Bale, 83–91, Great Titchfield Street, W. 1.
National Medical Journal—Monthly 3d.—346, Strand, W.C. 2.
Neurology and Psychiatry, Review of—25/- per annum—20, South Frederick Street, Edinburgh.
New York Medical Journal—Weekly 6d.—66, West Broadway, New York.
New York Medical Record—Weekly 6d.—Wm. Wood & Co., 51, Fifth Avenue, New York.
Nurses' Own Magazine and Midwives' Record—Monthly, 2/- per annum—Baillière, 8, Henrietta Street, W.C. 2.
Nursing Mirror and Midwives' Journal—Weekly, 1d.—28, 29, Southampton Street, W.C. 2.
Nursing Notes and Midwives' Chronicle—Monthly 2d.—12, Buckingham Street, Strand, W.C. 2.
Nursing Times—Weekly 1d.—Macmillan & Co. Lim., St. Martin's Street, W.C. 2.
Obstetrics and Gynæcology of the British Empire, Journal of—Monthly 2/6—Sherratt & Hughes, 33, Soho Square, W. 1.
Open-Air Schools and Children's Sanatoria, Year Book of—Yearly 7/6—Bale, 83–91, Great Titchfield Street, W. 1.
Ophthalmological Society's Transactions—Yearly 12/6—J. & A. Churchill, 7, Great Marlborough Street, W. 1.
Ophthalmology, British Journal of—Monthly, 31/6 per annum—Pulman and Sons Lim., 24, Thayer Street, W. 1.
Parasitology—Quarterly 30/- per annum—Cambridge University Press, Fetter Lane, E.C. 4.
Pathology and Bacteriology, Journal of—Quarterly 21/- per annum—Pathological Laboratory, Museums, Cambridge.
Pharmaceutical Journal—Weekly 6d.—17, Bloomsbury Square, W.C. 1.
Pharmacology and Experimental Therapeutics, Journal of—six times per annum for 21/—Cambridge University Press, Fetter Lane, E.C. 4.
Pharmacy, Year Book of—Yearly 10/-—7, Great Marlborough Street, W. 1.
Physiological Abstracts—Monthly 25/- per annum—H. K. Lewis & Co., 136, Gower Street. 1
Physiology (Experimental), Quarterly Journal of—25/- per annum—Chas. Griffin & Co. Lim., Exeter Street, W.C. 2.
Physiology, Journal of—Occasionally, 21/- per volume—Fetter Lane, E.C. 4.
Polyclinic—Monthly 6d.—Bale, 83–91, Great Titchfield Street, W. 1.
Practitioner—Monthly 2/6; 42/- per annum—2, Howard Street, Strand, W.C. 2. (*See Advertisement.*)
Prescriber—Monthly 1/-; 10/- per annum—6, South Charlotte Street, Edinburgh.
Psychology, British Journal of—Occasionally 15/-—Cambridge University Press, Fetter Lane, E.C. 4.

Psychology (Abnormal), Journal of—Bi-monthly 16/- per annum—Baillière, 8, Henrietta Street, W.C.2.
Public Health—Monthly 1/8—1. Upper Montague Street, W.C.1.
Public Health, Journal of the Royal Institute of—Monthly 2/-—37, Russell Square, W.C.1.
Quarterly Journal of Medicine—Quarterly 8/6—Oxford University Press, Amen Corner, E.C.4.
R.A.M.C., Journal of the—Monthly 2/-—Bale, 83–91, Great Titchfield St., W.1.
Radiology and Electro-Therapy, Archives of—Monthly 3/-—W. Heinemann, Ltd., 20 Bedford Street, W.C.2.
Röntgen Society, Journal of the—Quarterly 4/-—Smith & Ebbs Lim., Northumberland Alley, Fenchurch Street, E.C.3.
Royal Dental Hospital Reports—Quarterly, 5/- per annum—Bale, 83–91, Great Titchfield Street, W.1.
Royal Naval Medical Service, Journal of the—Quarterly, 15/- per annum—83–91, Great Titchfield Street, W.1.
Royal Sanitary Institute, Journal of the—Quarterly 3/-—12, Long Acre, W.C.2.
Royal Society of Medicine, Proceedings of the—Monthly, Nov. to July, 7/6 each part—Longmans, Green & Co., 39, Paternoster Row, E.C.4.
School Hygiene—Quarterly, 4/6 per ann.—Adlard, Bartholomew Close, E.C.1.
South African Medical Record—Fortnightly 1/-; 21/- per annum—Baillière, 8, Henrietta Street, W.C.2.
St. Bartholomew's Hospital Journal—Monthly 6d.—Students' Union, St. Bartholomew's Hospital, E.C.2.
St. George's Hospital Gazette—Monthly 6d.—83–91, Great Titchfield St., W.1.
St. Mary's Hospital Gazette—Monthly 5/- per annum—187, Edgware Road, W.2.
St. Thomas's Hospital Gazette, Monthly, 5/- per annum—7, Great Marlborough Street, W.1.
St. Thomas's Hospital Reports—Yearly 8/6—7, Great Marlborough Street, W.1.
State Medicine, Journal of—Monthly, 2/-—Bale, 83-91, Gt. Titchfield St., W.1.
Surgery, British Journal of—Quarterly, 8/6 net; 31/6 per annum—John Wright & Sons Lim., Bristol. (*See advertisement.*)
Surgery, Gynæcology, and Obstetrics, and International Abstract of Surgery—Monthly, 5/-; 50/- per annum—Baillière, 8, Henrietta Street, W.C.2.
Therapeutic Gazette—Monthly, 10/- per annum, 19 and 20, Great Pulteney Street, W.
Tropical Diseases Bulletin—Fortnightly 2/-—Baillière, 8, Henrietta Street, W.C.2.
Tropical Life—Monthly 1/-—Bale, 83–91, Great Titchfield Street, W.1.
Tropical Medicine and Hygiene, Journal of—Fortnightly 1/-; 18/- per annum—Bale, 83–91, Great Titchfield Street, W.1.
Tropical Medicine and Hygiene, Transactions of the Society of—Eight numbers yearly, 3/6 net each—H. K. Lewis & Co. Lim., 136, Gower Street, W.C.1.
Tropical Medicine and Hygiene, Year Book of—Yearly 7/6—Bale, 83–91, Great Titchfield Street, W.1.
Tropical Medicine and Parasitology, Annals of—Quarterly, 22/6 per annum—University Press, 57, Ashton Street, Liverpool.
Tuberculosis, British Journal of—Quarterly 1/6—Baillière, 8, Henrietta Street, W.C.2. (*See advertisement.*)
Tuberculosis Year Book and Sanatoria Annual—Yearly 7/6—Bale, 83–91, Great Titchfield Street, W.1.
Universal Medical Record—Monthly, 25/- per annum—36–38, Whitefriars Street, E.C.4.
West London Medical Journal—Quarterly 1/-—23, Bartholomew Close, E.C.1.

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Pache & Son, 75, Station Street, Birmingham

Artificial Limbs.

Anderson & Whitelaw, Lim., Broad Street Corner, Birmingham.
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Braid, A. E. & Co. Lim., 30, Gower Place, Gower Street, W.C. 1.
Grossmith, W. R., 110, Strand, W.C.2.
Haywood, J. H. Lim., Castle Gate, Nottingham.
Smith & Sheppard, 124, St. Stephen's Green, W. Dublin

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Dietetic Articles (Manufacturers of).

Allen & Hanburys Lim., Lombard Street, E.C. 3
Brand & Co. Lim., Mayfair Works, Vauxhall, S.W.
Brown, Gore & Co., Tower House, 40, Trinity Sq., E.C. 3 (Gautier Frères' Brandy)
Cadbury Bros. Lim., Bournville, Birmingham
Callard & Co., 74, Regent Street, W. 1 (Diabetic Foods)
Camwal Lim., 112, Pembroke Street, N. (Waters)
Carnrick & Co. Lim., 183, Acton Vale, W. 3
Colman, J. & J. Lim., Norwich
Casein Lim., Culvert Works, Battersea, S.W. 11
Fry, J. S. & Sons Lim., Bristol & London
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Maltine Manufacturing Co., Lim., 183, Acton Vale, W. 3
Rattray, A. Dewar, 188, Dumbarton Road, Partick, Glasgow (Wines and Spirits)
Therapeutic Foods Co. Lim., Covent Garden, W.C. 2
Tonagen, Ferris & Co. Lim., Bristol
Valentine's Meat-Juice Co., Richmond, Virginia, U.S.A.
Valkasa, Woolley Sons & Co. Lim., Manchester.
Wander, A. Lim., 45, Cowcross Street, E.C. 1
Watford Mfg. Co. Lim., Victoria Works, Watford

Druggists (Principal Wholesale).

Allen & Hanburys Lim., 37, Lombard Street, E.C. 3
Alliance Drug & Chemical Co., 34, Leadenhall Street, E.C. 3
Anglo-French Drug Co. Lim. (late Bresillon, M. & Co.), Gamage Buildings, Holborn, E.C. 1
Bishop, Alfred, Lim., 48, Spelman Street, E. 1.
Boots Pure Drug Co. Lim. Nottingham
Bristol-Myers Co., Brooklyn, New York
Burroughs Wellcome & Co., Snow Hill Buildings, E.C. 1
Christy, Thos. & Co., 4, 10, & 12, Old Swan Lane, E.C. 4
Cowie, W. B. & Co. Lim., 26, Clyde Street, Edinburgh
Denver Chemical Mfg. Co., 41, St. Ann's Road, Bow, London, E. 3
Duncan, Flockhart & Co., 155–157, Farringdon Road, E.C. 1, and Edinburgh
Evans Sons Lescher & Webb Lim., 60, Bartholomew Close, E.C. 1, and 56, Hanover St., Liverpool
Fellows Company of New York, 26, Christopher Street, New York.
Ferris & Co. Lim., Bristol
Fletcher, Fletcher & Co. Lim., Thane Road, Holloway, N.
Gale & Co. Lim., 15, Bouverie Street, E.C. 4
Giles, Schacht & Co. Clifton, Bristol
Guyot-Guenin & Son, 67, Southwark Bridge Road, S.E. 1
Harris (Philip) & Co. Lim., Edmund Street, Birmingham
Hewlett, C. J. & Son Lim., 35–42, Charlotte Street, E.C. 2
Hoffmann-La Roche Chemical Works Lim., 7 and 8, Idol Lane, E.C. 3
Hough, Hoseason & Co., Bridge St., Manchester

Howards & Sons Lim., Ilford, N.E.
Martindale, W., 10, New Cavendish Street, W.1
Matthews, Harold E. & Co., 30, The Mall, Clifton, Bristol
Maw, S., Son & Sons, 7–12, Aldersgate Street, E.C.1
May & Baker, Lim., Battersea, S.W.11
May, Roberts & Co. Lim., 7—13, Clerkenwell Road, E.C.1
Menley & James Lim., Menley House, Farringdon Road, E.C.1
Midgley, Chas., Lim., 4, Exchange Street, Manchester
Newbery, F. & Sons Lim., Charterhouse Square, E.C.1
Oppenheimer, Son & Co., Lim., 179, Queen Victoria Street, E.C.4
Parke, Davis & Co., Beak Street, Regent Street, W.1
Peat Products (Sphagnol) Lim., 18, Queenhithe, Upper Thames St., E.C.4
Phillips (Chas. H.) Chemical Co., 14, Henrietta Street, W.C.2
Quibell Bros. Lim., Newark.
Reynolds & Branson Lim., 13, Briggate, Leeds
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Rogers, F. A., 327, Oxford St., W.1
S. P. Charges Co., St. Helens, Lanes.
Savory & Moore Lim., 143, New Bond Street, W.1
Southall Bros. & Barclay Lim., Birmingham
Squire & Sons Lim., 413, Oxford Street, W.1
Sumner, R. & Co. Lim., 40, Hanover Street, Liverpool
Symes & Co. Lim., Liverpool
Wander, A., Lim., 45, Coweross Street, E.C.1
Whiffen & Sons Ltd., Battersea, S.W.11
Willows, Francis, Butler & Thompson Lim., 40, Aldersgate St., E.C.1
Woolley, Jas., Sons & Co. Lim., Victoria Bridge, Manchester
Zimmermann, Chas. & Co. (Chemicals), Lim., 9 & 10, St. Mary-at-Hill, E.C.3

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Baker, C., 244, High Holborn, W.C.1 (Microscopes)
Bausch & Lomb Optical Co., 37 and 38, Hatton Garden, E.C.1
Butt, Fredk. R., & Co. Lim., 147, Wardour Street, W.1
Cavendish Electrical Co. Ltd., 105–107, Great Portland Street, W.1
Cox, Harry W. & Co. Lim., 159–161, Great Portland Street, W.1
Dean, A. E. & Co., Leigh Place, Brooke Street, Holborn, E.C.1
Elliott & Sons Lim., Barnet, Herts. (X-Ray Plates).
Kodak Ltd. (Wratten Divis.), Kingsway, W.C.2 (X-Ray Plates)
Medical Supply Association, 167–185, Gray's Inn Road, W.C.1
Mottershead & Co., 7, Exchange St., Manchester
Newton & Wright Lim., 72, Wigmore Street, W.1
Schall & Son, 71–75, New Cavendish Street, W.1
Siemens Bros. & Co. Lim., 38 & 39, Upper Thames Street, E.C.4
Watson & Sons (Electro-Medical) Lim., 196, Gt. Portland St., W.1
Wellington & Ward, Elstree (X-Ray Plates)

Opticians.

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Barker, Francis & Son Lim., 12, Clerkenwell Road, E.C.1
Bausch & Lomb Optical Co., 37 and 38, Hatton Garden, E.C.1
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Davidson, F. & Co., 29, Great Portland Street, W.1
Newton & Wright Lim., 72, Wigmore Street, W.1
Spiller, George Lim., 32, Wigmore Street, W.1
Zeal, G. H., 82, Turnmill Street, E.C.1

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Rowley & Co. Ltd., 34, King Street, Manchester

Printers (Medical).

Cassell & Co. Lim. Ludgate Hill, E.C.
Wright, John & Sons Lim., Bristol

Publishers and Booksellers (Medical).

Adlard & Son and West Newman, Lim., Bartholomew Close, E.C.1
Appleton, D. & Co. 25 Bedford Street, Covent Garden, W.C.2
Arnold, Edward, 41 & 43, Maddox Street, W.1

Baillière, Tindall & Cox, 8, Henrietta Street, W.C.2
Bale, John Sons & Danielsson Lim., 83–91, Great Titchfield St., W.1
Black, A. & C., Lim., Soho Sq., W.1
Butterworth & Co., Bell Yard, Temple Bar, W.C.2
Cambridge University Press (C. F. Clay), Fetter Lane, E.C.4
Cassell & Co. Lim., La Belle Sauvage, Ludgate Hill, E.C.4 (and Printers)
Churchill, J. & A., 7, Great Marlborough Street, W.1
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Kimpton, Henry (Hirschfeld Bros. Lim.), 263, High Holborn, W.C.1
Lewis, H. K. & Co. Lim., 136, Gower Street, W.C.1
Lippincott, J. B. Co., 16, John Street, Adelphi, W.C.2
Livingstone, E. & S., Teviot Place, Edinburgh
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Maclehose, J. & Sons, 61, St. Vincent Street, Glasgow
Macmillan & Co. Lim., St. Martin's Street, W.C.2
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Murray, John, Albemarle Street, W.1
Nisbet, Jas. & Co. Lim., 22, Berners Street, W.1
Oliver & Boyd, Tweeddale Court, Edinburgh
Oxford Medical Publications (Henry Frowde and Hodder & Stoughton), Falcon Square, E.C.1
Oxford University Press (Humphrey Milford), Amen Corner, E.C.
Pulman, Geo. & Sons Lim., Thayer Street, W.
Saunders, W. B. Co., 9, Henrietta Street, W.C.2
Scientific Press Lim., 28 and 29, Southampton Street, W.C.2
Sherratt & Hughes, University Press, 34, Cross Street, Manchester
Simpkin, Marshall, Hamilton, Kent & Co. Lim., Stationers' Hall Court and Paternoster Row, E.C.4
Smith, Elder & Co., 15, Waterloo Place, S.W.1
Thacker, W. & Co., 2, Creed Lane, E.C.4 (Thacker, Spink & Co., Calcutta)
University of London Press Lim., Warwick Square, E.C.4
Wright, John & Sons Lim., Bristol (and Printers); London Depot, Stationers' Hall Court, E.C.4

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Maw, S., Son & Sons, 7 to 12, Aldersgate Street, E.C.1
Mayer & Meltzer, 71, Great Portland Street, W.1
Medical Supply Association, 167–185, Gray's Inn Road, W.C.1
Millikin & Lawley, 165, Strand, W.C.2
Montague, J. H., 69, New Bond Street, W.1
Mottershead & Co., 7, Exchange St., Manchester
Pache & Son, 75, Station Street, Birmingham (Artificial Eyes)
Patent Pulp Mfg. Co. Lim., 38, York Road, King's Cross, N.1 ("Red Cross" Bowls and Basins).
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Rothband, W. S. & Co., Bent Street, Manchester, N.
Salmon Ody Lim., 7, New Oxford Street, W.C.1 (Trusses)
Schaerer, M., 41, Berners St., W.1
Skeffington, A., 49, Ulundi Rd., Blackheath, S.E.3 (Invalid Lifters)
Sumner, R. & Co. Lim., 40, Hanover Street, Liverpool
Surgical Manufacturing Co., 85, Mortimer Street, W.1
Terry, Herbert & Sons Lim., Redditch (Spring Exercisers)
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Western Dental Mfg. Co. Lim., 74, Wigmore Street, W.1
White & Wright, 93, Renshaw Street, Liverpool
Woolley, Jas. Sons & Co. Lim., Victoria Bridge, Manchester

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Sumner, R. & Co. Lim., 40, Hanover Street, Liverpool

NOTE BOOK.

It is easier to make a note of a thing than to remember *where* the note was made. The following pages are indexed under their respective headings, and any note can be immediately found when required.

1918

JANUARY.						
S	•	6	13	20	27	
M	•	7	14	21	28	
Tu	1	8	15	22	29	
W	2	9	16	23	30	
Th	3	10	17	24	31	
F	4	11	18	25	•	
S	5	12	19	26	•	

NOTES.

Copy here any formula or fact you wish to keep for reference.

(These pages are indexed under the word "Notes.")

1918

FEBRUARY.						
S	•	3	10	17	24	•
M	•	4	11	18	25	•
Tu	•	5	12	19	26	•
W	•	6	13	20	27	•
Th	•	7	14	21	28	•
F	1	8	15	22	•	•
S	2	9	16	23	•	•

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See Advertisement, page xxiii. *Signed*..... .....**M.D.**

1918

MARCH.

S	•	3	10	17	24	31
M	•	4	11	18	25	•
Tu	•	5	12	19	26	•
W	•	6	13	20	27	•
Th	•	7	14	21	28	•
F	1	8	15	22	29	•
S	2	9	16	23	30	•

NOTES.

1918

APRIL.

S	•	7	14	21	28	
M	1	8	15	22	29	
Tu	2	9	16	23	30	
W	3	10	17	24	•	
Th	4	11	18	25	•	
F	5	12	19	26	•	
S	6	13	20	27	•	

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— GOLD MEDAL, 1913 —

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See Advertisement, page lv. Phone: Mayfair 636, 648.

1918

MAY.						
S	*	5	12	19	26	
M	*	6	13	20	27	
Tu	*	7	14	21	28	
W	1	8	15	22	29	
Th	2	9	16	23	30	
F	3	10	17	24	31	
S	4	11	18	25	*	

NOTES.

1918

JUNE.						
S	*	2	9	16	23	30
M	*	3	10	17	24	*
Tu	*	4	11	18	25	*
W	*	5	12	19	26	*
Th	*	6	13	20	27	*
F	*	7	14	21	28	*
S	1	8	15	22	29	*

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1918

JULY.						
S	*	7	14	21	28	
M	1	8	15	22	29	
Tu	2	9	16	23	30	
W	3	10	17	24	31	
Th	4	11	18	25	*	
F	5	12	19	26	*	
S	6	13	20	27	*	

NOTES.

1918

AUGUST.						
S	*	4	11	18	25	
M	*	5	12	19	26	
Tu	*	6	13	20	27	
W	*	7	14	21	28	
Th	1	8	15	22	29	
F	2	9	16	23	30	
S	3	10	17	24	31	

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1918

SEPTEMBER.						
S	1	8	15	22	29	
M	2	9	16	23	30	
Tu	3	10	17	24	*	
W	4	11	18	25	*	
Th	5	12	19	26	*	
F	6	13	20	27	*	
S	7	14	21	28	*	

NURSES.

Note whether Midwifery or Sick Nurses, their terms and addresses.

1918

OCTOBER.						
S	*	6	13	20	27	
M	*	7	14	21	28	
Tu	1	8	15	22	29	
W	2	9	16	23	30	
Th	3	10	17	24	31	
F	4	11	18	25	*	
S	5	12	19	26	*	

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1918

NOVEMBER.						
S	*	3	10	17	24	*
M	*	4	11	18	25	*
Tu	*	5	12	19	26	*
W	*	6	13	20	27	*
Th	*	7	14	21	28	*
F	1	8	15	22	29	*
S	2	9	16	23	30	*

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1918

DECEMBER.						
S	1	8	15	22	29	*
M	2	9	16	23	30	*
Tu	3	10	17	24	31	*
W	4	11	18	25	*	*
Th	5	12	19	26	*	*
F	6	13	20	27	*	*
S	7	14	21	28	*	*

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Abstainers and General Insurance Co., Ltd., Edmund St., Birmingham. *Gen. Manager*, H. J. Greening .. .. P	1883	40/11	55/10	82/3	1,082,346
Alliance Assurance Co. Ltd., Bartholomew Lane, E.C. *Gen. Man.*, O. Morgan Owen P	1824	48/9	64/5	90/9	8,185,903
Atlas Assurance Co. Ltd., 92, Cheapside, E.C. *Gen. Man.* Saml. J. Pipkin. *Act.*, William Penman .. .. .. P	1808	49/3	63/7	88/8	2,367,685
Australian Mutual Provident Society, Life, Endowments and Annuities, 37, Threadneedle Street, E.C. *Manager* for U.K., W. C. Fisher. Further particulars see page 725 .. .. .. M	1849	48/2	64/5	89/10	38,000,000
Britannic Assurance Co. Ltd., Life, Endowment Assurances, House Purchase, Broad Street Corner, Birmingham. *Chairman*, F. T. Jefferson, J.P. *Secretary*, J. M. Laing, F.I.A. Further particulars see page 724 .. .. .. P	1866	47/9	64/–	91/1	4,175,064
British Equitable Assurance Co. Ltd., 1, 2, 3, Queen Street Place, E.C. *Manager*, Basil May, F.I.A. .. .. .. P	1854	48/8	64/11	91/9	1,620,000
Caledonian Insurance Co., 19, George Street, Edinburgh. *Gen. Man.*, R. Hill Stewart, F.F.A London Offices, 82, King William St., E.C., and 14, Waterloo Place, S.W. P	1805	48/9	64/6	88/6	3,665,006
Canada Life Assurance Co., 15, King Street, Cheapside, E.C. *Man.*, A. D. Cheyne P	1847	48/5	65/4	94/2	11,949,694
Century Insurance Co. Ltd., 18, Charlotte Sq., Edinburgh. *Gen. Man.*, Hy. Brown. *Sec.*, John R. Little. London Office, 27, Queen Victoria St., E.C. *Man.*, S. G. Pasfield	1885	50/–	65/4	91/–	1,062,582
City Life Assurance Co. Ltd., 6, Paul Street, Finsbury, E.C. *Gen. Man.*, M. Gregory	1897	44/1	60/11	89/7	649,631
Clergy Mutual Assurance Society, Life, 2 & 3, Sanctuary, Westminster. *Act. and Man.*, F. B. Wyatt. *Sec.*, F. T. M. Byers. Further particulars see page 723 M	1829	46/4	62/2	87/4	4,311,858
Clerical, Medical, and General Life Assurance Society, 15, St. James's Square, S.W., and 1, King William Street, E.C. *Gen. Man. & Act.*, A. D. Besant .. .. P	1824	48/7	66/6	95/6	6,095,569
Colonial Mutual Life Assurance Society Ltd., 33, Poultry, E.C. *Man.*, Arthur E. Gibbs. *Assist. Man.*, E. A. Cawdron M	1873	47/4	63/2	89/9	4,369,960
Commercial Union Assurance Co. Ltd., 24, 25, and 26, Cornhill, E.C. *Act.*, A. G. Allen P	1861	47/10	65/2	92/4	7,104,345
Co-operative Insurance Society Ltd., 109, Corporation Street, Manchester. *Man.*, James Odgers. Further particulars see page 726 .. .. .. P	1867	47/4	63/1	90/1	775,000
Eagle Star and British Dominions Insurance Co., Ltd. Head Office, British Dominion House, Royal Exchange Avenue, E.C. 3 Life Dept., 32, Moorgate St., E.C. 2 *Man. Dir.*, Sir Edward M. Mountain .. P	1807	47/9	63/6	89/8	About 10,000,000
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English and Scottish Law Life Assurance Association, 33, St. James's Square, S.W. *Gen. Man.*, Albert G. Scott. *Act. & Sec.*, John Spencer, F.I.A. .. .. P	1839	47/1	62/8	87/9	2,981,274

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Equitable Life Assurance Society, Mansion House Street, E.C. *Act. & Man.*, W. P. Elderton. .. .. .. M	1762	53/5	67/11	90/7	4,865,954
Equity and Law Life Assurance Society, 18, Lincoln's Inn Fields, W.C. *Act. & Sec.*, W. P. Phelps, M.A., F.I.A. .. P	1844	48/10	64/6	90/9	5,006,780
Friends' Provident Institution, Bradford, Yorkshire. *Gen. Man. & Sec.*, Henry J. Tapscott *Act.*, Alfd. Moorhouse, F.I.A. M	1832	48/-	64/-	89/7	*3,478,304
General Accident Fire and Life Assurance Corporation Ltd., Perth, Scotland. *Gen. Man.*, F. Norie-Miller, J.P. .. P	1885	49/2	64/11	91/3	213,748
General Life Assurance Co., 103, Cannon Street, E.C. 4. *Assist. Sec.*, Albert Burton Nye. Further particulars see page 724 .. .. P	1837	49/10	65/4	92/8	2,038,149
Gresham Life Assurance Society Ltd., St. Mildred's House, Poultry, E.C. 2. *Man. & Sec.*, Alexander Lawson .. P	1848	47/6	62/10	88/6	9,732,873
Guardian Assurance Co. Ltd., 11, Lombard Street, and 21, Fleet St., E.C. *Gen. Man.*, Geo. W. Reynolds. *Act.*, Ernest Woods P	1821	48/10	64/6	89/3	4,427,684
Law Union and Rock Insurance Co. Ltd., Old Serjeants Inn, Chancery Lane. *Gen. Man.*, R. Stirling. .. .. P	1806	48/4	64/-	89/10	8,216,945
Legal & General Life Assurance Society, 10, Fleet St., E.C. *Act. & Man.*, E. Colquhoun P	1836	50/9	65/11	90/9	10,983,090
Life Association of Scotland, 82, Princes St., Edinburgh. *Man.*, Gordon Douglas. *Sec.* R. M. M. Roddick. London Office, 28, Bishopsgate, E.C. *Sec.*, J. C. Wardrop P	1838	48/11	64/10	91/1	5,686,136
Liverpool and London and Globe Insurance Co. Ltd., 1, Dale Street, Liverpool. *Gen. Man. & Sec.*, A. G Dent. London Office, 1, Cornhill, E.C. .. .. P	1836	49/10	65/9	91/3	4,930,672
London and Lancashire Life and General Assurance Association Ltd., 66, 67, Cornhill, E.C. *Gen. Man.*, W. Æneas Mackay. *Sec.*, Louis I. Jarvis. *Jnt. Asst. Secs.*, E. E. Dent and L. C. Kestin. *Act.*, Harold Dougharty P	1862	48/9	64/9	91/2	*3,949,438
London Assurance Corporation, 7, Royal Exchange, E.C. *Man.* of Life Dept., James Clunes. *Act.*, A. G. Hemming .. P	1720	49/-	64/8	90/2	*2,683,516
London Life Association, Ltd., 81, King William Street, E.C. *Act. & Man.*, H. M. Trouncer, M.A., F.I.A. .. M	1806	47/-	61/8	85/4	5,570,812
Marine and General Mutual Life Assurance Society, 14, Leadenhall Street, E.C. *Act. & Sec.*, S. Day, F.I.A. .. M	1852	48/10	65/-	91/6	2,181,090
Metropolitan Life Assurance Society, 13, Moorgate Street, E.C. *Sec.*, Bernard Woods. *Act.*, H. J. Baker, F.I.A. .. M	1835	49/9	66/4	92/-	2,326,249
Mutual Life and Citizens' Assurance Co. Ltd. (of Australia), Effingham Ho., 1, Arundel St. W.C. *Sec.*, Alex. S. Sellar, M.A., F.F.A. P	1886	48/9	65/3	89/9	10,238,706
Mutual Life Insurance Co. of New York, 7 & 8, Norfolk Street, Strand, W.C. 2. *Gen. Man.*, J. H. Harrison Hogge. *Sec.*, L.A. Mumford M	1843	48/9	66/-	97/-	126,044,625
National Benefit Life & Property Assurance Co. Ltd., National House, Newgate Street, E.C. *Man.*, J. Francis, J.P., F.S.S. *Sec.*, S. F. Gandell. Further particulars see page 726 .. .. P	1890	46/4	61/7	87/4	22,308
National Mutual Life Assurance Society, 39, King Street, Cheapside, E.C. *Act. & Man.*, C. Marks, O.B.E., F.I.A. *Sec.*, H. J. Lockwood. *Asst. Act.*, E. W. Townley, F.I.A. M	1830	48/4	63/7	89/6	2,892 598
National Mutual Life Association of Australasia Ltd., 5, Cheapside, E.C. *Man.*, H. W Meyers.	1869	46/8	61/6	87/2	10,127 573

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National Provident Institution, 48, Gracechurch Street, E.C. *Act. & Sec.*, L. F. Hovil .. .. .. M	1835	50/2	66/3	91/1	7,117,314
New York Life Insurance Co., Trafalgar Buildings, Trafalgar Square, London, W.C. *Gen. Man.*, E. H. Krause. *Sec.*, Wm. R. Collinson, F.C.I.S. .. .. M	1845	48/9	66/–	96/11	192,620,821
North British and Mercantile Insurance Co., 61, Threadneedle St., E.C. 2, & 64, Princes St., Edinburgh. *Gen. Man.*, London, A. Worley. *Life Man.*, London, D. C. Haldeman. *Gen. Man.*, Edin., Owen D. Jones P	1809	49/10	66/1	91/11	17,275,302
Northern Assurance Co. Ltd., 1, Moorgate Street, E.C. *Joint Gen. Managers*, H. Gayford, J. Robertson .. .. P	1836	49/–	64/8	90/10	*4,941,687
Norwich Union Life Insurance Society, Norwich. *Gen. Man. & Act.*, Davidson Walker. London Office, 49, Fleet Street, E.C.	1808	45/8	59/6	85/3	14,492,197
Pearl Assurance Co. Ltd., High Holborn, W.C. *Man'g Director*, G. Shrubsall, J.P. P	1864	49/–	65/–	92/–	10,627,178
Phœnix Assurance Co. Ltd., Phœnix House, King William St., E.C. 4. Trafalgar House, Waterloo Place, S.W. 1, & 187, Fleet Street, E.C. 4. *Gen. Man.*, Sir Gerald H. Ryan, F.I.A. .. .. P	1782	48/11	64/7	90/8	11,178,995
Provident Mutual Life Assurance Association, 27 & 29, Moorgate Street, E.C. *Act. & Sec.*, C. R. V. Coutts .. .. M	1840	46/4	62/8	92/2	2,906,691
Prudential Assurance Co. Ltd, Holborn Bars. *Sec.*, G. E. May. Further particulars see page 725 .. P	1848	49/6	65/11	91/11	49,384,910
Refuge Assurance Co. Ltd., Oxford Street, Manchester. *Gen. Mans.*, J. Proctor Green and W. H. Aldcroft. London Office, 133, Strand, W.C. .. .. .. P	1864	49/3	65/9	91/9	10,728,837
Royal Exchange Assurance Corporation, Royal Exchange, E.C., and 44, Pall Mall, S.W. *Act.*, H. E. Nightingale, F.I.A. P	1720	49/–	64/9	90/2	4,673,982
Royal Insurance Co. Ltd., 1, North John St., Liverpool. *Man.*, G. Chappell. London Offices, 24–28, Lombard Street. *Sec.* to London Board, R. M'Connell .. P	1845	48/8	64/4	90/4	11,856,879
Scottish Amicable Life Assurance Society, St. Vincent Place, Glasgow. *Man.*, W. Hutton. *Sec.*, C. Guthrie. London Office, 1, Threadneedle St., E.C. *Sec.* H. Robertson .. .. M	1826	51/9	66/3	90/1	*5,998,490
Scottish Equitable Life Assurance Society, 28, St. Andrew Square, Edinburgh. *Man. & Act.*, G. M. Low. *Sec.*, J. J. McLauchlan. London Office, 13, Cornhill, E.C. 3. *Sec.*, P. W. Purves. .. .. .. M	1831	50/–	65/5	90/6	*6,333,307
Scottish Life Assurance Co. Ltd., 19, St. Andrew Square, Edinburgh. *Man.*, Lewis P. Orr, F.R.S.E. London Office, 9 & 10, King St., E.C. *Sec.*, L. Campbell P	1881	49/5	64/6	90/5	2 466,880
Scottish Provident Institution, 6, St. Andrew Square, Edinburgh. *Man.*, J. G. Watson. *Sec.*, R. T. Boothby. *Joint Asst. Secs.*, C. W. Thomson & Jas. C. Lindsay. *Act.*, W. G. Walton. London Offices, 3, Lombard St. E.C., and 17, Pall Mall, S.W. .. M	1837	42/4	56/6	83/2	16,175,638
Scottish Temperance Life & Accident Insurance Co., Ltd., 109, St. Vincent Street, Glasgow. *Manager*, Adam K. Rodger. London, 2, 3 & 4, Cheapside. *Man.*, W. A. Bowie. *Less 10 per cent to Whole Life Abstainers* .. .. .. P	1883	48/6	63/9	89/10	2,495 553

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Scottish Union & National Insurance Co., 35, St. Andrew Square, Edinburgh. *Gen. Man.*, J. A. Cook. London Office, 5, Walbrook, E.C. 4. *Sec.*, James G. Nicoll .. P	1824	48/9	64/6	89/6	8,300,579
Scottish Widows' Fund Life Assurance Society, 9, St. Andrew Square, Edinburgh. *Man. & Act.*, G. J. Lidstone. *Sec.*, Geo. C. Stenhouse. London Offices, 28, Cornhill, E.C., and 17, Waterloo Place, S.W. M	1815	51/9	66/3	90/7	22,444,824
Standard Life Assurance Co., 3, George Street, Edinburgh. *Man.*, Leonard W. Dickson. London Offices, 83, King William St., *Sec.*, C. E. Fox, and 3, Pall Mall East., *Sec.*, F. M. Willats .. .. P	1825	48/11	64/5	89/–	13,580,000
Star Assurance Society, 32, Moorgate Street, E.C. *Gen. Man.*, J. Douglas Watson. P	1843	49/9	66/3	93/8	*7,029,216
Sun Life Assurance Society, 63, Threadneedle Street, E.C. *Act.*, R. G. Salmon, F.I.A. *Sec. & Gen. Man.*, E. Linnell; *Assistant Sec.*, G. M. Searle, F.I.A. P	1810	49/2	66/6	94/2	10,990,476
Sun Life Assurance Co. of Canada, Canada House, 4 & 5, Norfolk Street, W.C. *Man.*, J. F. Junkin .. .. .. P	1865	48/6	65/4	94/1	*15,019,395
United Kingdom Provident Institution, 196, Strand, W.C. *Sec.*, H. W. Hasler M	1840	49/6	65/–	91/10	*9,755,158
University Life Assurance Society, 25, Pall Mall, S.W. *Act. & Sec.*, R. Todhunter, M.A. .. .. .. P	1825	49/11	65/4	91/5	866,139
Wesleyan & General Assurance Society, Life, Annuities, Sickness, Assurance Buildings, Steelhouse Lane, Birmingham. *Gen. Man.*, A. L. Hunt. London Office, Halton House, 20-23, Holborn, E.C. Further particulars see page 724 .. M	1841	48/1	65/8	93/10	2,877,220
Yorkshire Insurance Company, Ltd., Chief Offices: St. Helen's Square, York. Bank Buildings, Princes Street, E.C. *London Branches*, 55, Pall Mall, S.W.; 49, Sloane Square, S.W.; 222-225, Strand, W.C.; 132, Newington Crescent, S.E., 43, Broadway, Stratford, S.E. .. .. P	1824	49/1	64/9	91/7	2,796,827

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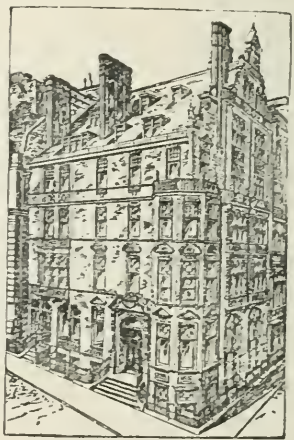

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Assistant Gynæcologists—DR. J. HAIG FERGUSON, DR. WILLIAM FORDYCE, Lecturers in Clinical Gynæcology, Edinburgh University.

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Physicians—DR. NORMAN WALKER, DR. FRED GARDINER, Lecturers in Dermatology.
Assistant Physician—DR. R. GRANSTON LOW.

OPHTHALMIC DEPARTMENT.

Consulting Surgeons—SIR GEORGE A. BERRY, DR. GEORGE MACKAY.
Surgeons—DR. W. G. SYM, DR. J. V. PATERSON, Lecturers in Ophthalmology.
Assistant Surgeons—DR. A. H. H. SINCLAIR, DR. H. M. TRAQUAIR.

EAR AND THROAT DEPARTMENT.

Consulting Surgeons—DR. P. M. M'BRIDE, DR. R. M'KENZIE JOHNSTON.
Surgeons—DR. A. LOGAN TURNER, DR. J. MALCOLM FARQUHARSON, Lectrs. in Ear & Throat Diseases.
Assistant Surgeons—DR. JOHN S. FRASER, *DR. JOHN D. LITHGOW.

DENTAL DEPARTMENT.

Consulting Surgeon—MR. WILLIAM GUY. **Surgeon**—MR. J. H. GIBBS.

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Extra Medical Electrician *(for Radium Cases)* DR. DAWSON TURNER.
Medical Electricians—DR. W. HOPE FOWLER, DR. ARCHIBALD M'KENDRICK.

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Pathologist—PROFESSOR LORRAIN SMITH. **Clinical Pathologist**—MISS FITZGERALD.
Assistant Pathologists—DR. JAMES MILLER, DR. J. W. DAWSON.
Superintendent—*LIEUT.-COL. SIR JOSEPH FAYRER, Bart., M.D., F.R.C.S.E.
Acting Superintendent—WILLIAM S. CAW, J.P.

HOSPITAL TICKETS.—Perpetual Ticket, in one payment, £12; Annual Ticket, £6 6s.; Six Months, £4 4s.; Three Months, £2 2s.; One Month, £1 1s. Separate payments, amounting to £12 12s. entitle the Student to a perpetual Ticket on production of previous Season Tickets.

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No fees are charged for any Medical or Surgical Appointments in this Hospital, which are as follows:

1. Resident Physicians and Surgeons who must be registered as legally qualified Practitioners, are from time to time appointed by the Managers on the recommendation of the Physicians and Surgeons. The holders of these offices live in the house free of charge. The appointment is for six months, but may be renewed at the end of that period by special recommendation.
2. Non-Resident House Physicians and Surgeons and clinical Assistants, who must also be registered as legally qualified Practitioners, are appointed by the Managers on the recommendation of the Physicians and Surgeons. The appointment is on the same terms as that of the Resident Physicians and Surgeons.
3. Clerks and Dressers are appointed by the Physicians and Surgeons. These appointments are open to all Students and Junior Practitioners holding Hospital Tickets.

Assistants in the Pathological Department are appointed by the Pathologist.

WILLIAM S. CAW, *Treasurer and Clerk.*

* Absent on National Service.

. . THE . .

UNIVERSITY OF LIVERPOOL

FACULTY OF MEDICINE.

The University grants degrees in Medicine, Surgery, Hygiene, Dental Surgery, and Veterinary Science, and Diplomas in Public Health, Tropical Medicine, Dental Surgery, Veterinary Hygiene, Anatomy, Bacteriology, Bio-chemistry and Parasitology.

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Hospitals.—The Clinical School consists of four general hospitals—the Royal Infirmary, the David Lewis Northern Hospital, the Royal Southern Hospital, and the Stanley Hospital; and of five special hospitals; the Eye and Ear Infirmary, the Hospital for Women, the Infirmary for Children, St. Paul's Eye Hospital, and St. George's Hospital for Skin Diseases. These hospitals contain in all a total of over 1140 beds.

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Royal College of Surgeons of Edinburgh

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The Faculty of Medicine embraces twelve chairs, from which instruction is given in all the main branches of Medical Science.

Practical Classes in connection with these chairs are conducted by the Professors and Assistants in Laboratories furnished with all the necessary appliances; and opportunities are afforded to Students and Graduates to extend their practical knowledge and engage in original research.

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Bursaries, Scholarships, Fellowships and Prizes, to the number of 50 and of the Annual Value of £1183, may be held by Students in this Faculty.

The cost of Matriculation, Class and Hospital Fees for the whole curriculum, inclusive of the fees for the Degrees, is usually about £160.

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Signed, **GEORGE E. WAUGH, F.R.C.S.,** *Dean to the Medical School.*

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The Hospital is situated near Upton Park Station, to which frequent Trains run on the District and London and Tilbury Railways.

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To protect, support, and safeguard the character and interests of legally qualified Medical and Dental Practitioners; to advise and assist Members of the Society in matters affecting their professional character and interests; and to indemnify them in regard to actions, etc., undertaken on their behalf.

INDEMNITY AGAINST DAMAGES.

This is the only Medical Society in England which pays for its Members, in actions which are unsuccessful, costs of the other side and damages.

Members of the London and Counties Medical Protection Society are not only indemnified against the cost of defending or conducting actions undertaken on their behalf by the Society, whether as plaintiffs or defendants, but are also, subject to the provisions of the Articles of Association, indemnified up to £2,000 in any one year for any one Member, against the damages and costs of the other side which may be awarded against them in cases which the Society has defended or conducted on their behalf, but in which it has not been successful.

Provision has been made for the latter purpose of an available sum of £24,000 per annum.

Subscription, £1 per annum. Entrance Fee 10 -

The Reserve Funds of the Society, as on 31st December, 1917, amounted to a sum of £22,000, and, in addition to this, the Guarantee Fund of the Society represents an amount of more than £5,240.

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The Secretaries, 32 Craven Street, Strand, London, W.C. 2.

DEXTRA DARE.

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General Secretary: A. G. BATEMAN, M.B.

THE OBJECTS OF THE UNION ARE AS FOLLOWS:

I.—To support and protect the character and interests of Medical Practitioners practising in the United Kingdom.

II.—To promote honourable practice, and to suppress or prosecute unauthorised practitioners.

III.—To ADVISE and DEFEND or assist in defending Members of the Union in cases where proceedings involving questions of professional principle or otherwise are brought against them

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The Guarantee Fund exceeds £11,000, and is available should any occasion require its being called up, but up to the present time all claims for administration, legal, and other costs have been defrayed out of income.

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Application Forms, Copies of last Report and any other information can be obtained by applying to the Secretary at the Registered Offices.

A. G. BATEMAN, M.B., *General Secretary.*

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And generally Promoting the Efficiency and Welfare of Masseuses.

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TEACHERS' CERTIFICATE (London, October).

For further information apply to MISS E. M. TEMPLETON,
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Or at **23 Lime Grove, Oxford Road, MANCHESTER.**

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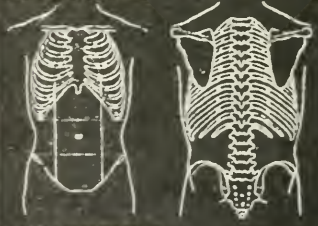

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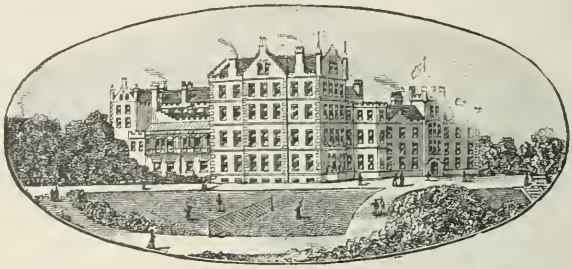

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Dr. STREET or Dr. WOOTTON attends at 47 Rodney St., Liverpool, every Thursday, from 2 to 4. *Telephone:* "*Royal 2456.*"

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For Forms or further particulars, apply to the Physician Superintendent,
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Voluntary Boarders and Inebriates admitted without Medical Certificates.

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The Mansion stands high, among handsomely laid out gardens in the midst of a picturesque deer park (about 40 head of deer are kept), and commands a magnificent view of Welsh mountain scenery.

Carriages, horses, motor, lawn-tennis, golf, trout and other fishing are provided.

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The Asylum is situate about ten miles from Shrewsbury, within easy distance of Baschurch Station, G.W.R., whither carriages can be sent at any time for visitors.

Letters and Telegrams should be addressed to—

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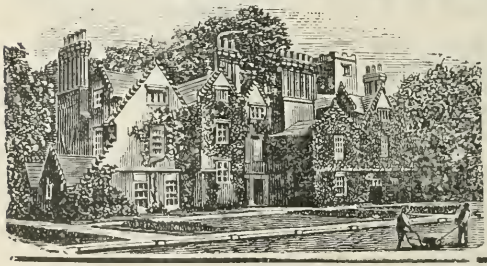

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The House stands in grounds of ten acres (within 5 minutes' drive of either Station), and is devoted to the Care and Treatment of a few Ladies suffering from Nervous and Mental Affections, who enjoy the comfort, privacy, and occupations of home life. Voluntary Patients are received without certificates.

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Established 1826.

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Telegrams: **"Alleviated, London."** *Telephone:* **New Cross 576.**

AN Institution licensed for the **CARE and TREATMENT of the MENTALLY AFFLICTED of both Sexes.** Conveniently situated. Electric trams and omnibuses from the Bridges and West-End pass the House. Private houses with electric light for suitable cases adjoining the Institution. Holiday parties sent to the Seaside branch at Worthing during Summer months.

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For Terms, apply to the RESIDENT MEDICAL SUPERINTENDENT,

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A Registered Hospital for the Treatment of Mental Diseases.

Under the management of a Committee of Members of the Society of Friends. Situated about two miles from York Station. The Patients are derived from the **Upper and Middle Classes**, and none are paupers or rate-aided. **Terms from £3 13s. 6d. weekly.**

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For further particulars see the Annual Report, which will be sent on application to Dr. BEDFORD PIERCE, the Medical Superintendent. *Nat. Telephone:* **112 York.**

THROXENBY HALL, Near SCARBOROUGH.

A Branch House connected with The Retreat, York, situated near the Raincliffe Woods, about two miles from Scarborough, for the reception of **Convalescent Patients**, also for the treatment of persons suffering from **Incipient or mild forms of Mental Disorder** who cannot be certified as of unsound mind, and who wish voluntarily to place themselves under skilled treatment.—For further particulars apply to the MATRON, THROXENBY HALL, SCARBOROUGH; or to DR. BEDFORD PIERCE, at THE RETREAT, YORK. *Nat. Telephone:* **282 Scarborough.**

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Staffed by Nurses who have been trained for four years in the Retreat, and conducted upon a profit-sharing basis. MENTAL and NERVOUS CASES only undertaken.

TRAINED FEMALE NURSES, £3 3s. Weekly. Apply MATRON, Retreat, YORK. *Nat. Tel. 112.*

Incorporated by Royal Charter.

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THE INSTITUTION has been entirely re-organized and enlarged by the addition of *two wings*, for the reception of acute cases, so as to render it an efficient *Hospital* as well as a comfortable *Home*.

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Physician Superintendent:
R. DODS BROWN, M.D., F.R.C.P.E

Telephone No.:
104 Perth.

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An old-established and modernized Institution for the Medical Treatment of Ladies and Gentlemen Mentally Afflicted.

THE House, pleasantly situated, stands in picturesque grounds of forty acres in extent, with a surrounding country noted for the beauty of its walks and drives. The climate is genial and bracing. Occupation, indoor and outdoor amusements, and carriage and other exercise amply provided.

TERMS vary according to requirements as to accommodation, special attendance, etc.

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A Sanatorium for Ladies and Gentlemen suffering from Nervous and Mental Disorders.

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For further information, see London Medical Directory, p. 2049, and for Terms, etc., apply to Dr. J. D. THOMAS, Resident Medical Proprietor, Northwoods House.

DR THOMAS *attends at* 64, *PARK STREET, BRISTOL, on Mondays and Thursdays, from* 12 *to* 1.30 *o'clock.*

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A REGISTERED HOSPITAL for PRIVATE PATIENTS Only, of the UPPER and MIDDLE CLASSES.

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TELEPHONE No. 7. *Resident Superintendent.*

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PLYMPTON, SOUTH DEVON
ESTABLISHED 1834.

PLYMPTON HOUSE is licensed for the accommodation of both sexes, and is well adapted by its position and appointments for the **Medical Treatment and Care of Patients of the Upper and Middle Classes, suffering from MENTAL DISEASE.**

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Telephone: No. 2 PLYMPTON. DR. TURNER, PLYMPTON.

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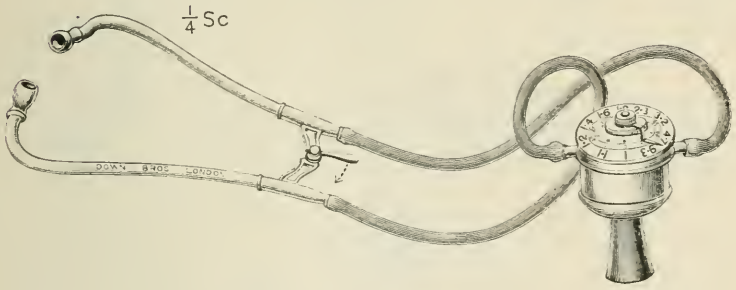

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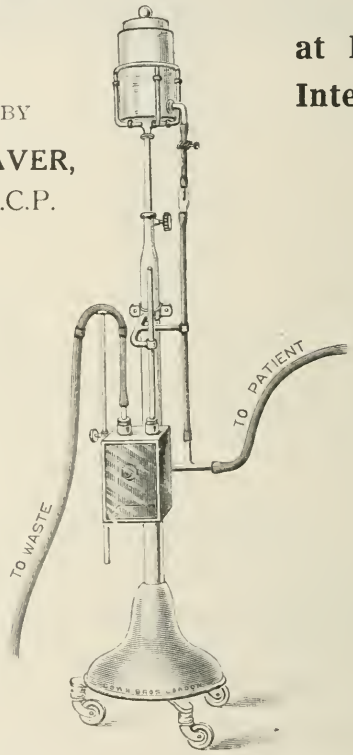

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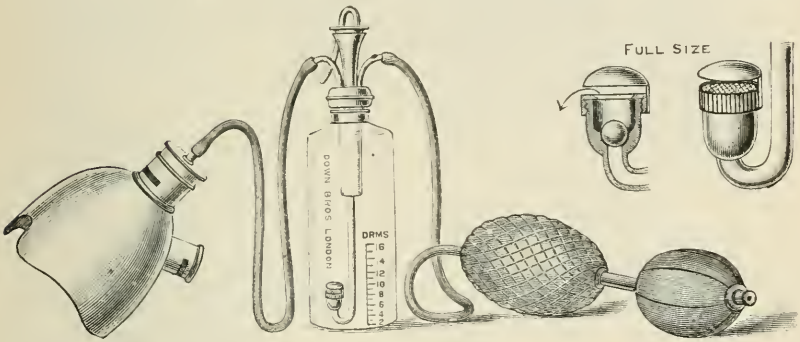

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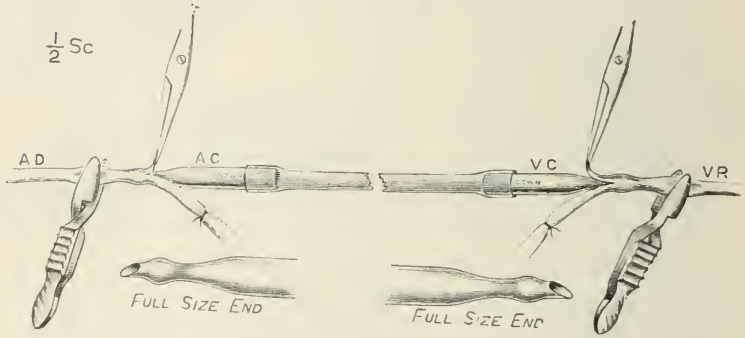
(Vide THE LANCET, May 12th, 1917.)



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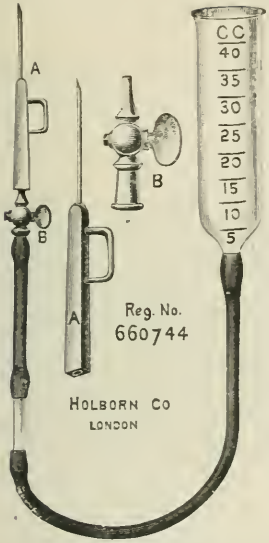

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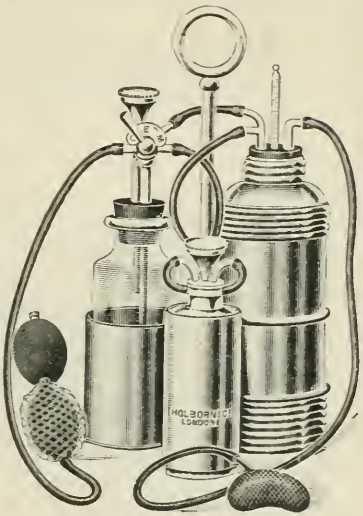

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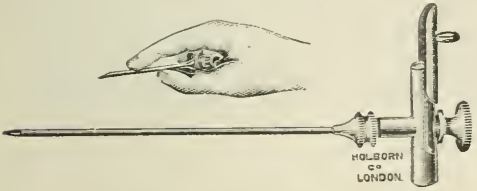

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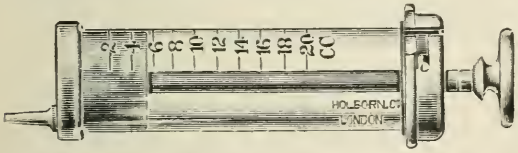

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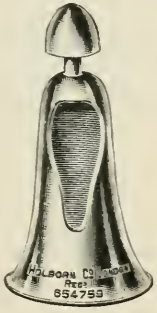

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Patent No. 14567/16

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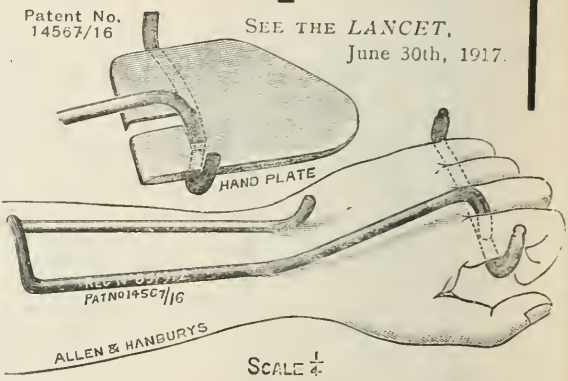

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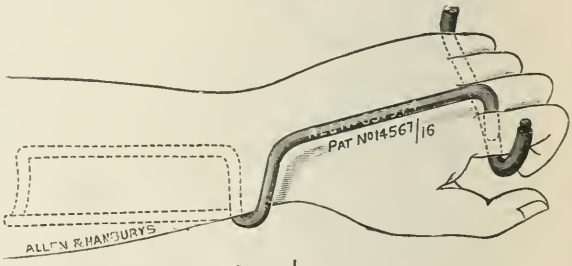

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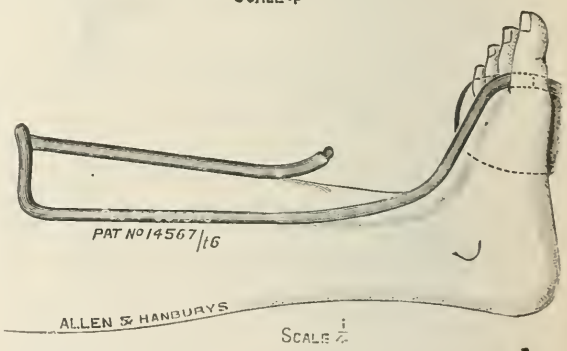

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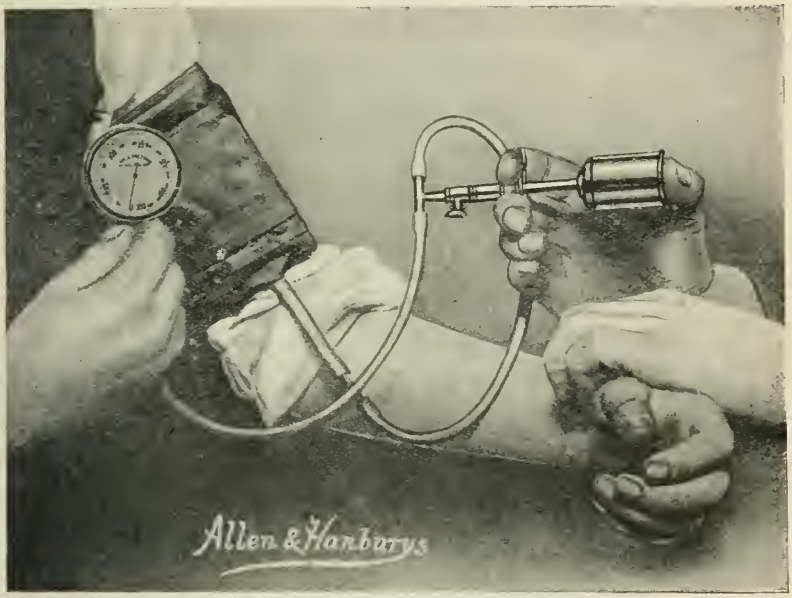

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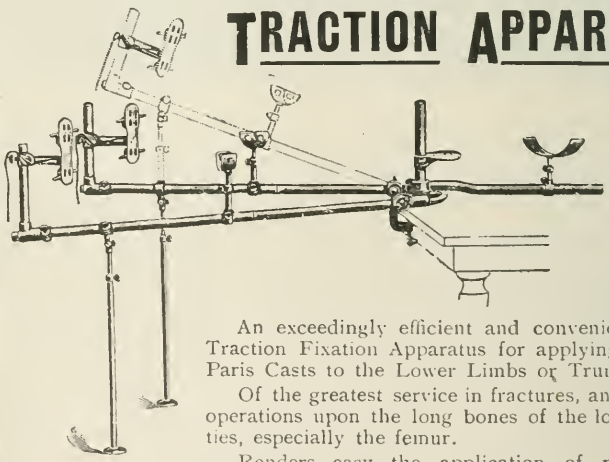

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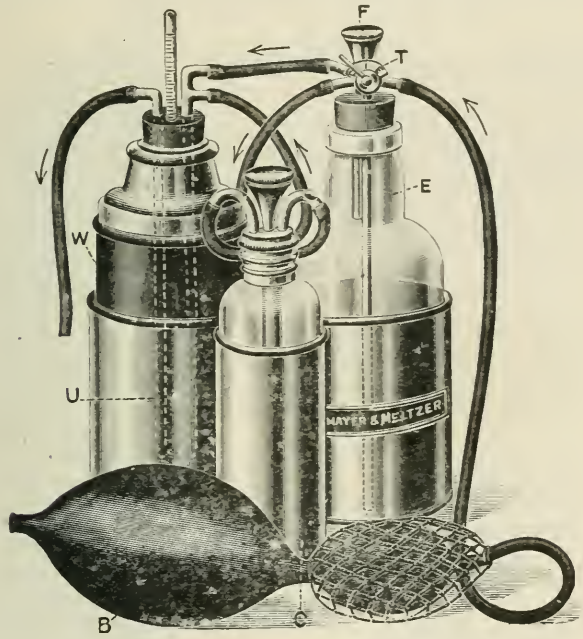

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(*Vide* article in *Lancet*, January 8th, 1916, by FRANCIS E. SHIPWAY, M.A., M.D.Cantab.)

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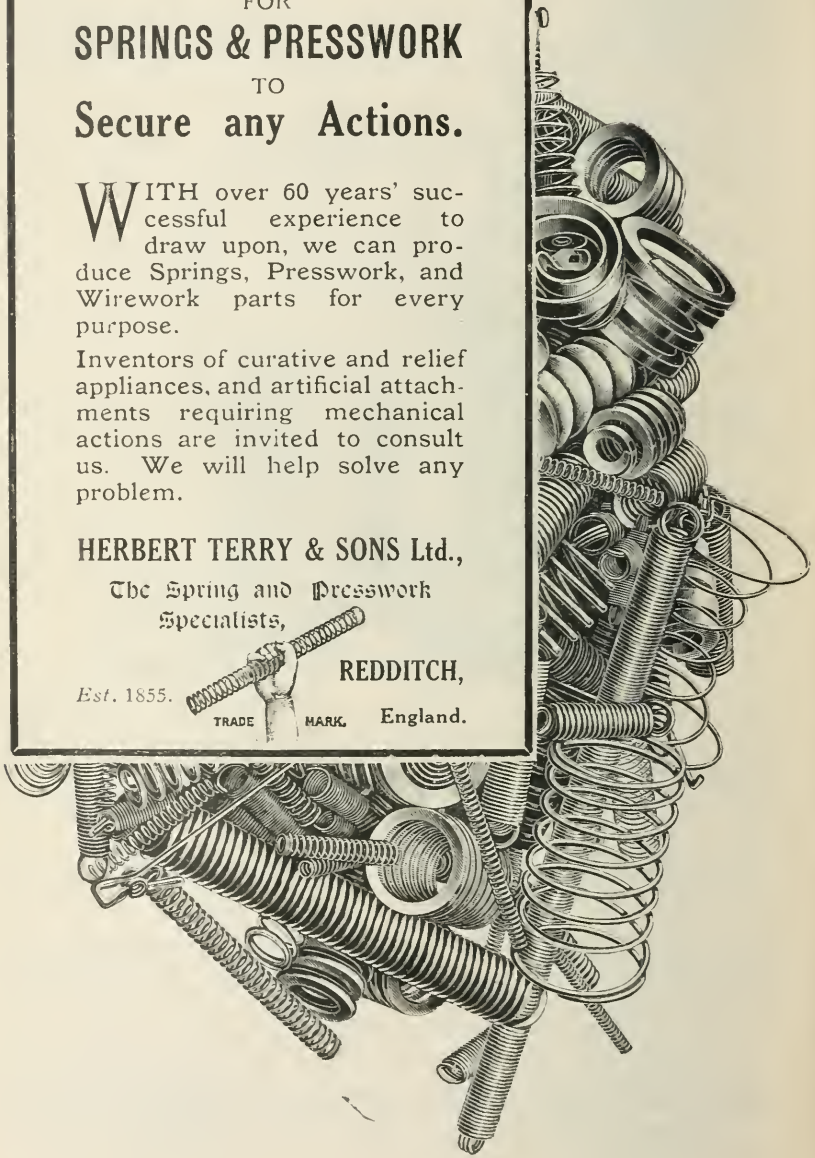

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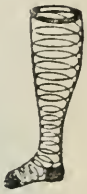

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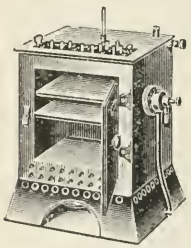

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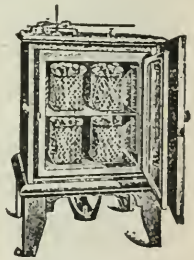

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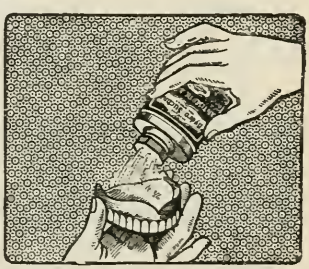

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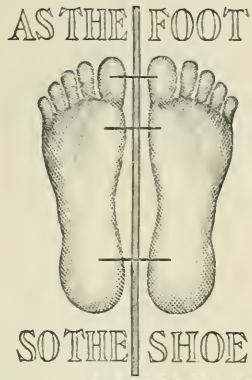

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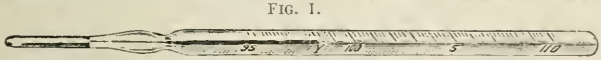

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Ditto	ditto	ditto	½ ,,	,,	28	6	,,
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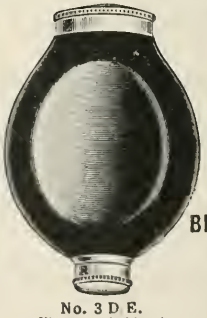

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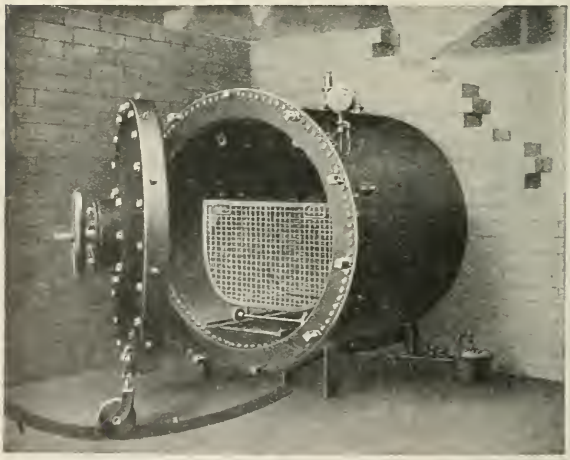

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